PROSPECTUS

The Lake Erie and Ohio River Ship Canal Company

PRELIMINARY AND CONFIDENTIAL

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THE LAKE ERIE AND OHIO RIVER SHIP CANAL COMPANY

FRICK BUILDING

Pittsburgh, Pa., July 1907.

Mr.

Dear Sir:

This preliminary and confidential prospectus of the Lake Erie and Ohio River Ship Canal Company is now being presented to a few of the large tonnage producers in the Pittsburgh District for their consideration, criticism and opinion.

We would deem it of great value to have judgment passed upon it by those WHO KNOW present transportation conditions, and COULD APPRECIATE the possibilities offered by the canal before preparing the final prospectus for underwriters.

We believe that independent of its investment possibilities, you may be able to see a sufficient return in the reduction of present cost of transportation to warrant your interest in its being successfully promoted.

We hope to have some expression from you within thirty days after receipt of this book.

Yours very respectfully,

Board of Directors.

PROSPECTUS

THE LAKE ERIE AND OHIO RIVER SHIP CANAL COMPANY

PRELIMINARY AND CONFIDENTIAL

1907

THE LAKE ERIE AND OHIO RIVER SHIP CANAL COMPANY

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THE LAKE ERIE AND OHIO RIVER SHIP CANAL.

PRACTICABILITY.

1.—A commission of the Legislature of Pennsylvania appointed in 1889 reported the canal entirely practicable, at reasonable cost, and of great commercial advantage.

2.—Extensive investigation and surveys by the Chamber of Commerce of Pittsburgh, 1895-96, resulted in a report concurring in the finding of the State Commission and declaring that private capital could profitably undertake the construction of the canal.

These conclusions were passed upon and confirmed by engineers of national reputation, viz., General Henry L. Abbot, retired, Corps of Engineers, U. S. Army, Consulting Engineer of Panama Canal; Lewis M. Haupt, C. E., Philadelphia, member of Nicaragua Canal Commission, and Major N. H. Hutton, Chairman Harbor Board of Baltimore.

3.—In 1905 the Merchants and Manufacturers Association of Pittsburgh, now merged with the Chamber of Commerce, revived interest in this project, and as a result, a canal company was formed. This company procured charters from Pennsylvania, (Lake Erie and Ohio River Ship Canal Company) and Ohio, (The Ohio and Pennsylvania Ship Canal Company), and after exhaustive and thorough investigation and surveys in the field, secured a National Charter (The Lake Erie and Ohio River Ship Canal Company) by Act of Congress, June 30, 1906. In accordance with

these laws the Board of Directors has adopted a route and fixed the location of the canal to which it has an indefeasible title as against all competitors, and the project is now ready for immediate undertaking. (See statement as to practicability and general description, under Physical Features, page No. 27.)

BUSINESS FOR CANAL.

That there is sufficient present and prospective business for the canal and of such a character as to justify the investment, is clearly shown as follows:

SOURCES OF BUSINESS.

1.—Great Lakes—Lake end of canal.

2.—Pittsburgh District—River end of canal.

3.—Ohio River.

4.—Canal route between lake and river.

The following tables relating to commerce in above districts show that it has doubled every six to ten years in the past, and that the products of mines average 80 per cent. of same.

1.—GREAT LAKES.—Total tonnage (Dept. Commerce & Labor U. S.)

1904	51,370,855	net tons
1905	67,345,620	" "
1906	75,610,690	" "

(Tonnage 1906 over 80 per cent. ore and coal.)

(a) "SOO" CANAL, Total tonnage passing. (Dept. Commerce and Labor U. S.)

Year.	Tons.
1881	1,567,774
1887	5,494,649
1893	10,796,572
1899	25,255,810
1905	44,720,680
1906	51,751,080

Of the above for 1906, 35,357,042 tons ore passed east.
7,728,255 " soft coal passed west.
1,011,375 " hard " " "

Total ..... 44,096,672 "—85%.

(b) Detroit River, Total tonnage passing. (Dept. Commerce and Labor U. S.)

Year.	Tons.
1905.....	53,639,086
1906.....	60,578,155

Of above for 1906, 32,208,009 tons ore passed south.
11,561,111 " soft coal passed north.
2,960,920 " hard " " "

Total.....46,730,040 " —77%

2.—Pittsburgh District. (River end of canal.)

A thorough investigation of the Canal Committee of the Chamber of Commerce of Pittsburg in 1896, estimated the river and rail tonnage in and out of the Pittsburgh District (a radius of forty miles with Pittsburgh as center and not including freight in transit), at 60,000,000 tons.

The Chamber of Commerce estimate for 1906 in said District (not including freight in transit) is as follows:

Railway, 3,500,000 cars ..... 113,000,000 net tons
Harbor ..... 9,000,000 " "

Total ..... 122,000,000 " "

Of above for 1906:

Coal ..... 48,400,000 tons
Coke ..... 20,160,000 "
Ore to districts served by canal..... 21,184,067 "

Total ..... 89,744,067 "

Coal, coke and ore about 74 per cent. of total tonnage.

3.—Ohio River. (Annual Report Chief of Enginners U. S. Army.)

1906—Up stream	2,689,911	tons
Down stream	10,473,745	"
Total	13,163,656	"

The volume of traffic on this river in its present intermittent state of navigation confirms the opinion that a great increase of traffic must result from the permanent navigable condition now being provided by the Government.

This increase will be further augmented by the union of this stream through the canal with the Great Lakes and tributary canals, making it possible for the commerce of the vast territory they serve to reach the mouth of the Mississippi River, and thence through the Panama Canal to Pacific Coast, and through the Erie Canal to the Atlantic Coast at New York.

(a) Monongahela River. (Dept. Commerce and Labor U. S.)

1904	8,175,527	tons
1905	10,993,133	"
1906	11,498,855	"

4.—Along Canal Route.—Between lake and river.

This tonnage was estimated by the Canal Committee of Chamber of Commerce of Pittsburgh in 1896, to be 30,000,000 tons. It is estimated to have been not less than 60,000,000 tons for 1906, and about 78 per cent. was ore, coke and coal, as follows:

Ore....	21,184,067	tons,	lake	to	river	and	on	canal	route
Coke...	9,000,000	"	river	"	lake	"	"	"	"
Coal....	16,730,000	"	"	"	"				
Total...	46,914,067								

The above are the through shipments of coal from the Pittsburgh and West Virginia Districts to the lake, and do not include coal

shipped to manufacturers along line of canal. The coke is the tonnage west of Pittsburgh to furnaces located along canal route and on Great Lakes, but this tonnage is not included in the estimated tonnage for canal, on which estimate of earnings is based.

The following Lake Erie ports receive the iron ore which goes by rail to furnaces along canal route and the Pittsburgh District, on the Monongahela and upper Ohio Rivers, and through same ports the Lake Erie soft coal goes from Pittsburgh District, West Virginia and Ohio to upper Lake ports.

(Department Commerce and Labor U. S.)

	Receipts Iron ore—gross tons 1906	Shipments Soft coal—net tons 1906
Cleveland	6,662,049	2,888,544
Fairport	1,832,623	276,328
Ashtabula	6,726,882	2,477,885
Conneaut	5,412,156	829,348
Erie	2,097,308	668,759
Buffalo and Tonawanda	4,915,308	412,911
Lorain	2,159,580	2,185,165
Sandusky	32,019	745,084
Toledo	1,438,396	2,314,247
Huron		771,375
Total	31,276,321	13,569,646

Of the ore coming down the Detroit River in 1906 to Lake Erie ports, the following shows the amount forwarded from the docks to the furnaces in the districts named:

1 to Pittsburgh District	11,230,000
2 " Mahoning and Shenango Valleys	7,172,000
3 " Upper Ohio River (Wheeling District)	2,841,000
4 " Lower Ohio River	746,000
5 " Buffalo and East	5,630,000
6 " Columbus, O.	625,000
7 " Cleveland, Toledo, Lorain and Detroit	3,408,000
8 " Virginia	72,000
Total	31,724,000

The first four districts using 21,989,000 tons, would have water transportation through canal from Lake Erie to furnaces. District five, which includes ore to Johnstown, Pa., amounting to 1,500,000 tons, would have water service from Lake Erie to Pittsburgh.

The following table shows soft coal loaded on vessels at following Lake Erie ports for transhipment and for vessel fuel for the year 1906. (Dept. Commerce and Labor U. S.):

	Transhipment.	Vessel fuel.	Total.
Buffalo	43,260	352,609	395,869
Ashtabula	2,256,813	256,054	2,512,867
Cleveland	2,604,769	451,769	3,056,538
Conneaut	666,475	176,251	842,726
Erie	564,788	128,541	693,329
Fairport	226,112	55,798	281,910
Lorain	1,605,832	203,266	1,809,098
Sandusky	669,294	112,510	781,804
Toledo	2,210,604	64,381	2,274,985
Huron	739,288	47,315	786,603
Total	11,587,235	1,848,494	13,435,729

The total lake tonnage of coal for transhipment and vessel fuel from Pittsburgh, West Virginia and Ohio Districts for the six years ending December, 1906, is as follows: (John H. Jones, President Pittsburgh-Buffalo Company.)

	Tons.
1901	6,873,901
1902	8,703,258
1903	11,349,541
1904	9,893,000
1905	11,575,000
1906	14,510,000

District division comparing as follows:

	Tons 1904.	Tons 1905.	Tons 1906.
Pittsburgh District	6,058,000	7,460,000	9,200,000
West Virginia	1,966,000	2,108,000	2,750,000
Ohio	1,869,000	2,007,000	2,560,000
Total	9,893,000	11,575,000	14,510,000

The above authority states that from contracts already made for 1907, it is indicated that the coal tonnage from the Pittsburgh District in 1907 to the lakes for transhipment and vessel fuel will approximate 11,000,000 tons.

The same operator states that the amount of coal going from above districts, all rail haul, for direct consumption would equal forty per cent. of the coal for transhipment and vessel fuel which makes the total coal movement in 1906 from the Pittsburgh and West Virginia Districts to Lake Erie ports (for which canal would provide water service) as follows:

	Tons.
Pittsburgh District	12,880,000
West Virginia	3,850,000
Total	16,730,000

The ore tonnage coming from Lake Erie ports to furnaces that would be supplied with water transportation through the canal, has increased from 8,000,000 tons in 1896 to over 21,000,000 tons in 1906, and the coal going to Lake Erie ports from the Pittsburgh District and West Virginia, (also provided with water transporation by the canal) for consumption at said ports, vessel fuel, and transhipment to upper lake ports has increased from 6,000,000 tons in 1901 to over 16,500,000 tons in 1906, showing an average annual increase in ore of over 1,300,000 tons and an average annual increase in coal of about 2,000,000 tons or a combined annual increase of over 3,000,000 tons.

ESTIMATED TONNAGE FOR DISTRICT AND CANAL.

The above tables show over 38,000,000 tons of coal and ore as passing between these points in 1906, and assuming the canal to be begun in 1908, and completed in five years, the following table will show the probable tonnage available in coal and ore at time canal is opened for business, in comparison with amount of esti-

mated canal tonnage for ten years following its opening, on the basis of a conservative average annual increase of only 2,000,000 tons of coal and ore.

	Coal and Ore Tonnage,		Estimated Tonnage for Canal Balance Sheet.
1906	38,000,000		
1907	40,000,000		
1908	42,000,000		
1909	44,000,000		
1910	46,000,000		
1911	48,000,000		
1912	50,000,000		
1913	52,000,000	canal opens	3,000,000
1914	54,000,000		5,500,000
1915	56,000,000		10,500,000
1916	58,000,000		16,500,000
1917	60,000,000		22,500,000
1918	62,000,000		26,500,000
1919	64,000,000		30,000,000
1920	66,000,000		33,000,000
1921	68,000,000		36,000,000
1922	70,000,000		38,000,000

An analysis of the movement of coal and ore as given in foregoing tables shows that the ore shipped by rail from Lake Erie to furnaces in the districts at the river end of canal, and the coal shipped from said districts by rail to Lake Erie, furnishes nearly 50 per cent. of the total tonnage passing through the Detroit River.

A further index of the volume of traffic in the canal district for 1906 is shown by the reports of the car service associations, the number of cars handled in their respective territories is as follows:

	Cars.
Pittsburgh	3,295,463
Illinois and Iowa	3,085,315
Chicago	2,251,763
Philadelphia	2,218,755
Terminal (Minneapolis)	1,712,345
Missouri Valley	1,665,882
New England	1,974,894
New York and New Jersey	1,100,967

Product of mines explains large business of Pittsburgh District and indicates why water transportation is demanded.

COMMERCIAL NECESSITY.

The commercial interests of the country are now facing a problem which has reached a crisis through inadequate transportation facilities. The problem must be met by capital going into further railway development, or by the Government improving the natural waterways, or by private capital connecting existing waterways under chartered powers, such as are held by this company.

The first solution is prohibitive under no less authority than James J. Hill, President of the Great Northern Railroad, when in his letter to Governor Johnson, of Minnesota, of January 14, 1907, he said that in the last ten years railroad building has increased only 21 per cent., while business has increased 110 per cent., and "if only 25 per cent. additional with necessary terminals and equipment, making 33 per cent., is to be built in the next five years, the new work would amount to $5,500,000,000 in round numbers, or a yearly average of $1,100,000,000. That is the sum which should be spent in railroad development before the commerce of the country can be moved properly."

The hope of Government appropriation for our internal waterway systems in amount and with promptness to meet this crisis is not to be thought of or even hoped for.

It is, however, practicable to consider that this company by an expenditure not exceeding $60,000,000 up to the time the canal is earning dividends, will unite the Great Lake System, with its tributary canal, and river outlets to the sea via Montreal and New York, with the Ohio and Mississippi River systems, thereby connecting 15,000 miles of interior navigable waterways, reaching twenty-four states and the Dominion of Canada. The utility of this system for

relief of present conditions can be seen in the fact that the enlarged New York State Canal will be completed by the time this canal can be built (in not exceeding five years), and the work of the Government, now in progress of canalizing the Ohio from Pittsburgh to the Mississippi, will be far advanced when the connection is made.

Every dollar expended in making this waterway connection will do more to solve the transportation problem and bring relief to the eastern half of the country than thirty dollars spent in solving it by further railway development, and the possibility of the returns on the investment are proportionately large, as the economy of transportation it can effect insures the business for it.

The figures above set forth showing the sources of business for this canal, its volume and character and its continued expansion and growth, prove the truth of Mr. Hill's statement that railroads cannot meet the conditions and that the requirements would be prohibitive. At no point in the country would this be more true than in the section around the headwaters of the Ohio and along the canal route through the Beaver and Mahoning Rivers, where the topography of the country is such as to prohibit much further track and terminal facilities at any cost.

COMMERCIAL ECONOMY OF CANAL.

This canal, as per Transportation Statement, can handle tonnage by the barge system between the steel plants and coal fields of the Pittsburgh District and Lake Erie, an average distance of 140 miles, at not exceeding following cost figures, including transfer of coal at lake, transfer of ore at lake, and from canal vessel to stock pile at furnace. (See statement as to methods and cost of carrying freight in steamers or barge fleets, on page No. 23.)

ORE—	Cost per ton, cents.	Cost per ton mile, mills.
Operation and maintenance transfer (lake)	4.0	0.29
" " " vessel	8.1	0.58
" " " canal	8.0	0.57
" " " transfer (furnace)	4.0	0.29
	24.1	1.73

COAL—		
Operation and maintenance transfer (lake)	4.0	0.29
" " " vessel	8.1	0.58
" " " canal	8.0	0.57
	20.1	1.44

Average coal and ore including transfers	1.58
Coal f. o. b. canal vessel at lake	1.15
Combined system, per transportation statement, all freight	1.12

The following shows the proposed **charges:**

ORE—	Rate per ton, cents.	Rate per ton mile, mills.
Transfer at lake	6.0	0.43
Vessel rate	13.2	0.94
Canal tolls	35.0	2.50
Transfer to stock pile	6.0	0.43
	60.2	4.30

COAL—		
Vessel rate	13.2	0.94
Canal tolls	30.0	2.14
Transfer at lake	6.0	0.43
	49.2	3.51

Average coal and ore, including transfers	3.90
Coal f. o. b. canal vessel at lake	3.08
Combined systems, per transportation statement, all freight	4.10

RAIL CHARGES.

The charge on ore from vessel to dock and dock to car is 20 cents per ton, and rail rate to Pittsburgh District (average 140 miles) including switching and labor to stock pile at furnace is $1.14 per ton.

The system of rebates or premiums allowed consignees by the dock companies results in an average allowance of 9 cents per ton on a season's ore business, taking into consideration premium for direct ore as well as the arbitrary rebate allowed on dock shipments.

The rail rate on coal from Pittsburgh District to Lake Erie is 88 cents per ton, and dock charge 9 cents per ton for transfer to lake vessel bottom. The rail rate on coal as above for consumption at Lake Erie ports f. o. b. cars is $1.00 per ton.

The following will show, therefore, present rail rate, transfer at lake, switching and labor at furnace and ton mile rate on ore from lake vessel bottom to stock pile at furnace in Pittsburgh District, and rail rate and transfer of coal from mines in said district to lake steamer bottom, and ton mile rate, in comparison with estimated canal charges for same service on an average distance of 140 miles.

	Per ton.	Rate, per ton mile, mills.
ORE—		
Dock charges	$ 0.20	
Rail rate	1.14	
	1.34	
Less average rebate	0.09	
Net charges by rail	$ 1.25	8.93
COAL—		
Rail rate	$ 0.88	
Dock charges	0.09	
	$ 0.97	6.93
Coal f. o. b. cars Lake ports		7.14

CANAL AND RAIL RATES COMPARED.

	Canal cost ton mile, mills.	Canal rate ton mile, mills.	Rail rate ton mile, mills.
Ore (lake vessel bottom to furnace stock pile)	1.73	4.30	8.93
Coal (mine to lake vessel bottom)	1.44	3.51	6.93
" (f. o. b. canal vessel at lake)	1.15	3.08	7.14
" and ore with transfers, average)	1.58	3.90	7.98

As to **cost** figures for railroads, that of the Bessemer and Lake Erie is by far the lowest inasmuch as this road is owned and operated as a department of the United States Steel Corporation between Pittsburgh and Lake Erie, and publishes the same tariff rate on coal and ore as other lines, equalling 8.93 mills per ton mile on ore from lake steamer bottom to stock pile at furnace, and 6.93 mills per ton mile on coal from mine to lake steamer bottom.

By their department report of operation, however, for the year ending December 31st, 1906, they show **cost** of operation and maintenance equal to a ton mile **cost** of freight moved of 2.08 mills per ton mile and a **rate** of 4.38 mills per ton mile. The **cost** and **rate** above given cover only the actual main line from f. o. b. cars at lake to Union Railway terminal at Pittsburgh. Adding the net dock charges on a season's ore business 11 cents, and 5 cents to cover switching and labor by Union Railroad, or total 16 cents per ton, would make the average **rate** by this line on ore from lake vessel bottom to stock pile at furnace, and coal from mine to lake vessel bottom, 5.53 mills per ton mile. Assuming 10 cents per ton to be the **cost** of dock and switching service, the total **cost** per ton mile on ore and coal as above by this road would be 2.80 mills per ton mile.

In this estimate of cost is considered the interest on capital investment in trackage and land necessary to handle ore at furnaces

by rail, which requirement would be unnecessary or materially reduced in handling ore by water.

The greater economy of transfer of ore and coal via canal over rail is apparent in that the low cost of canal barges to carrying capacity will permit of their being kept in sufficient number at lake loaded with coal or empty for ore to eliminate the necessity for dockage of either commodity, and the expense incident thereto, but will permit direct transfer at all times.

Conditions favor a low cost and rate on the Bessemer and Lake Erie Railroad in comparison with other lines. Being a mineral railroad with through freight, its tracks are not encumbered with a large business in general mechandise, local freight or passenger business requiring movement of trains on its tracks at different speeds, which increases operating cost for roads doing a general freight and passenger business.

The following will show comparison between the Ship Canal and the department rate of the Bessemer and Lake Erie Railroad as to average cost and rate in handling ore from lake vessel bottom to stock pile at furnace, and coal mine to lake vessel bottom.

	Cost per ton mile, mills.	Rate per ton mile, mills.
Ship Canal	1.58	3.90
Bessemer and Lake Erie R. R.	2.80	*5.53

The freight carried by this road is largely ore for the furnaces of said Steel Corporation at Pittsburgh, and return cargo of coal for transhipment, and the statement of operation mainly applies to the movement of these commodities.

CANAL PROFITS.

The sample balance sheet of the canal estimates the net profits will reach 6 per cent. on the capital stock before the fifth year of operation, indicating that following the fifth year of operation

* Published rate equals ore 8.93 mills, coal 9.63 mills for same service.

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AUTHORIZED CAPITAL, NATIONAL CHARTER

$400 000 BONDS (PER MILE CANAL
400 000 STOCK) AND BRANCHES

SAMPLE BALANCE SHEET

CONSTRUCTION, OPERATION AND FINANCIAL STATEMENT

THE LAKE ERIE AND OHIO RIVER SHIP CANAL COMPANY

MAIN CANAL, 103 MILES
BRANCH CANALS, 32 MILES

AUTHORIZED CAPITAL, STATE CHARTERS
NO LIMIT TO AMOUNT OF CAPITAL
OR CLASS OF SECURITIES ISSUED

CONSTRUCTION COST							TONNAGE AND LOCKAGE				WATER REQUIREMENTS AND SUPPLY										GROSS EXPENSES									GROSS EARNINGS					NET EARNINGS				
		Bond Sale		Stock Sale				Vessels Per Day				Water Required	By Percentage				WATERSHED					Maintenance and Operation		Bond Interest		Tax on Stock					Toll Earnings Average 32.5 cts. Per Ton				Total Earnings				
	Years Construction	Years Operation	Per Year (Dollars)	Total Sale Dollars	Per Year (Dollars)	Total Sale (Dollars)	Total Bonds and Stock (Dollars)	Estimated Tonnage	Steamer Barge Fleet 3600 Tons	Barge Fleet 3600 Tons	Lockages Per Day	Total (Cubic Feet)	++ Lockage	Evaporation and Absorption	Seepage	Leakage, Spring Supply (Cu. ft. per Sec.)	NAME	Area (Sq. Miles)	Annual Min. Precipitation (In's)	Depth Needed (In's.)	Available Water Supply (Cubic Feet)	Per Year (Dollars)	Per Ton Mile (Mills)	Per Year (5%) (Dollars)	Total (Dollars)	Per Year (Dollars)	Per Yr on Surplus (Del'rs)	Total Needed During Construction (Dollars)	Sinking Fund (Dollars)	Total Disbursements Per Year (Dollars)	Total Disbursements Per Ton Mile (Mills)	Per Year	Interest on Sinking Fund (4%)	Earnings From Sale of Surplus Stock	Total Earnings Per Year (Dollars)	Total Earnings Per Ton Mile (Mills)	Per Year (Dollars)	Per Ton Mile (Mills)	Total (Dollars)	Years Operation	Years Construction
[illegible]	1	..	2,060,000	.....	440 000	....	2,500,000	.....	..	..	..	.....	..	..	..	..		..	..	..	..	.....	..	.....	..	.....	..	2,500,000	..	.....	..	.....	..	.....	..	.....	..	.....	..	1
[illegible]	2	..	6,180,000	8,240 000	1,423,000	1 895,200	10,105,200	.....	..	..	..	.....	..	..	..	..		..	..	..	..	.....	..	103,000	.....	2,200	..	10,105,200	..	.....	..	.....	..	.....	..	.....	..	.....	..	2
[illegible]	3	..	10,300,000	18 540,000	2,612 000	4 486,526	23,026,526	.....	..	..	..	.....	..	..	..	..		..	..	..	..	.....	..	412,000	515,000	9,320	..	23,026,526	..	.....	..	.....	..	.....	..	.....	..	.....	..	3
	4		12 360 000	30 900 000	3,567 000	8 075 959	38,975 959	.....	..	..	..	.....	..	..	..	..		..	..	..	..	.....	..	927,000	1,442,000	22,433	..	38,975,959	..	.....	..	.....	..	.....	..	.....	..	.....	..	4
	5		10,300 000	41,200 000	3,745,000	11 861,339	53,061,339	.....	..	..	..	.....	..	..	..	..		..	..	..	..	.....	..	1,545,000	2,987,000	40,380	..	53,061,339	..	.....	..	.....	..	.....	..	.....	..	.....	..	5
	6	1	..	..	..	..	..	3.000.000	1	3	4	10,758.205,000	9 4	44 9	33.1	12 0	French, Cussewago, Pymatuning, Mill, Summit, Mosquito, Mahoning & Cuyahoga	1785	31	2 59	21,536,944,000	1,100,000	2 62	2,060,000	..	59,307	..	..	..	3,219,307	7 67	975,000	..	2,244,307	3,219,307	7 67	..	..	1	6
	7	2	..	..	..	..	..	5,500,000	2	6	8	11.773.485,000	17 2	41 0	30 5	11 5	"	"	"	2 84	"	1,135,500	1 47	"	..	59,307	11,222	..	..	..	3,266,029	4 24	1,787,500	..	1,478,529	3,266,029	4 24	..	..	2	7
[illegible]	8	3	..	..	..	..	..	10 500 000	3	12	15	13,611,965,000	28 4	35 5	26 2	9 9	"	"	"	3 28	"	1,206,000	0 82	"	..	59,307	18 615	..	..	..	3,343,922	2 27	3,412,500	..	..	3,412,500	2 32	68,578	0 05	68,578	3	8
[illegible]	9	4	..	..	..	..	..	16.500.000	5	19	24	15,916,925,000	38 7	30 3	22 4	8 6	"	"	"	3 84	"	1,291,500	0 56	"	..	206,000	..	..	447,800	4,005,300	1 73	5,362,500	..	..	1,357,200	0 59	1,425,778	4	9
[illegible]	10	5	..	..	..	..	..	22.500.000	7	25	32	17,947.485,000	45.7	26 9	19 9	7 5	"	"	"	4 33	"	1,377,000	0 44	"	..	"	..	..	"	4,080,800	1 30	7,312,500	18,091	..	7,330,591	2 33	3,239,791	1 03	4,665,559	5	10
	11	6	..	..	..	..	..	26,500,000	8	30	38	19,511,565,000	50 0	24 8	18 3	6 9	"	"	"	4 70	"	1,434,000	0 39	"	..	"	..	..	"	4,147,800	1 12	8,612,500	36,913	..	8,649,413	2 33	4,501,613	1 21	9,167,182	6	11
	12	7	..	..	..	..	..	30 000,000	9	34	43	20,801,245,000	53 2	23 2	17.1	8 5	"	"	"	5 02	"	1,484,000	0 35	"	..	"	..	..	"	4,197,800	1 00	9,750,000	55,765	..	9,805,765	2 33	5,607,965	1 33	14,775,147	7	12
	13	8	..	..	..	..	..	33,000,000	10	37	47	22 245,968,000	54 2	21 9	17 8	6 1	French, Cussewago, Pymatuning, Mill, Summit, Mosquito, Mahoning, Cuyahoga, *Oil & Sugar	2240	"	4 27	27,210.808,000	1,527,000	0 33	"	..	"	..	..	"	6,240,800	1 35	10,725,000	74,617	..	10,799,617	2 34	4,558 817	0 99	19,333,964	8	13
	14	9	..	..	..	..	..	36,000,000	11	41	52	23,535,648,000	56 8	20 7	16 8	5.7	"	"	"	4 52	"	1,570,000	0 31	"	..	"	..	..	"	4,283,800	0 85	11,700,000	93,470	..	11,793,470	2 34	7,569,670	1 49	26,843,634	9	14
	15	10	..	..	..	..	..	38,000,000	11	43	54	24,084.448,000	57 7	20 2	16 5	5 6	"	"	"	4 64	"	1,600,000	0 30	"	.....	"	..	..	"	4,313,800	0 82	12,350,000	112,323	....	12,462,323	2 34	8,148,523	1 53	34,992,157	10	15
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41

To make calculations conservative, length of navigation season (221 days) and tonnage capacity of vessels have been assumed at their minimum.

+Additional feeder necessary, cost $2,000,000, paid for from earnings
++Lock chambers, 400'x56' and 280'x56'.

* Published rate equals ore 8.33 mills, coal 9.09 mills for same service.

the average toll rates (32.5 cents per ton) can begin to be reduced as the tonnage increases in following years.

On the tenth year of operation the average toll rates could be reduced to 18 cents per ton, thereby reducing the average ton mile rate on coal and ore, including necessary transfers to 2.86 mills per ton mile (as compared with Bessemer and Lake Erie Railroad present cost figures of 2.80 mills exclusive of fixed charges) and the canal still pay over 6 per cent. on its capital stock.

SAMPLE BALANCE SHEET OF THE LAKE ERIE AND OHIO RIVER SHIP CANAL COMPANY.

Following the statement of charter rights as to issue of bonds and stock, the canal company's sample balance sheet shows a period of five years for construction, assumed by the engineers to be ample time, with good management, especially when considering that supplies of all descriptions may be easily procured from nearby points. The amount of money needed to the end of the fifth year, for actual construction, including interest on bonds and taxes, is $53,061,339. It will be observed that the canal in the third year of operation is self-sustaining, and between the fourth and fifth years pays a dividend on the capital stock of six per cent.

ADVANTAGES CO-OPERATION RAILWAYS AND CANALS.

The advantage and economy both to railroads and shippers in having waterways to co-operate in handling low class freight and stimulating the production and carriage of high class freight by the railroads is apparent in the ton mile rate of railroads in countries where this policy has been promoted and encouraged, as compared with the United States where waterways have been neglected, discouraged and even opposed.

RAILROAD RATES, Per Ton Mile:

Great Britain	2.80 cents
Italy	2.50 "
Russia	2.40 "
France	2.20 "
Germany	1.64 "
Belgium	1.60 "
Holland	1.56 "
United States	**0.76** "

The average railroad rate per ton mile in foreign countries is higher than in this country, for the reason that foreign roads carry only high class freight,—the rate for which per article is, however, somewhat less than the rate for same articles here.

RATES GREAT LAKES AND OHIO AND MISSISSIPPI RIVERS.

A comparison of rates charged for freight movement on the Great Lakes and the Ohio and Mississippi Rivers shows that the above cost and rate for freight movement through the canal is conservative.

1—GREAT LAKES, 1906.

	Rate per ton mile, mills.
Ore, f. o. b. Duluth to f. o. b. Lake Erie ports	0.62
Soft coal, Lake Erie ports to f. o. b. Duluth	0.39
Hard coal, Lake Erie ports to f. o. b. Duluth	0.35

2.—OHIO AND MISSISSIPPI RIVERS.

The report of the Ohio River Board of United States Engineers, made to the Chief of Engineers December 15th, 1905, gives the commerce of the Ohio River for 1905 as 13,955,918 tons.

The exact charge for carrying this freight is not stated in the report, but one of the members estimated it in present unimproved condition of rivers. The Board, however, made estimate of freight charges, when Ohio River is improved to 9 feet. The estimates are as follows:

	River unimproved. Rate per ton mile, mills.	River improved Rate per ton mile,mills.
Ohio River, Pittsburg to Louisville.	0.76	0.50
Mississippi River, Louisville to New Orleans	0.50	0.37

By freight charges is meant the vessel rate which includes cost of operation and maintenance of vessel and interest on capital invested.

Canal Tonnage.

The estimate of tonnage for the canal, and cost and rate movement of freight, is confined to the present movement of ore and coal, with prospective increase when canal is open.

The coke tonnage now going to lake furnaces and other existing heavy freight, such as lumber, grain, flour, brick, limestone, building stone, cement, manufactured iron and steel, is left out of the account.

That a vast tonnage will come into existence through the union of the Great Lakes and river systems and the facilities for economic movement this canal will create, needs no argument. It can be imagined but not estimated.

Much of this tonnage will be of a higher class than coal and ore and bear a higher vessel rate and canal toll.

The Government report of commerce on the Great Lakes for 1906 shows that the average cargo of vessels through the "Soo" Canal was 2,446 tons. This disproves the claim that if we cannot have leviathan ships and 10,000 ton carriers, we cannot trade or do business by water transportation.

It is apparent that this canal will have running through it vessels and barges that can navigate both canal and lake to lower lake ports and through enlarged Erie Canal to New York and through Canadian Canals and St. Lawrence River.

ACCESSIBILITY OF CANAL TONNAGE.

An important factor in the utility of any system of transportation is its ability to reach the points where freight is created or to be delivered. The canal will render this direct service to over three-fourths of the iron and steel producing industries of the country, as they lie on the banks of the waterway systems connected by this canal, and the great ore fields on Lake Superior and coal fields of Western Pennsylvania and West Virginia (via the Monongahela, Kanawha and Ohio Rivers) will lie directly on the waterway and can meet at the steel works by **all-water** transportation, and these steel works will have like service for wide distribution of their heavy finished products in this country and to reach tidewater for export.

A census of the coal producing industries of the Pittsburgh District shows that mines having a production equal to or over fifty per cent. of Lake shipments for 1906, have present facilities, or can arrange facilities, at little cost, to load into canal vessels at their works.

There is a minimum of 7,000 tons of coal per acre in the Pittsburgh "vein." A saving of 50 cents per ton in the cost of carrying this coal to the consumer gives an added value to the coal in the ground of $3,500 per acre. On a shipment of 2,000 tons per day to the lake trade, it would mean $1,000 per day profit over present cost of reaching consumer.

If this profit were divided between producer and consumer, it would extend the markets for the producer and increase the purchasing power of the consumer, which means expansion for both.

It is claimed by one of the largest coal operators in the Pittsburgh district that this economy of transportation being provided would justify coal operators introducing electric haulage sys-

tem, at moderate cost in construction and operation, and going back over ten miles from the Monongahela River to bring their product to vessels operating through this canal.

TRANSPORTATION.

(Methods and Cost.)

The volume of business expected to pass through the canal during the first ten years of operation is set forth on the averaged statement, page 25.

This freight tonnage will likely be carried in either one or all of the four following manners.

1. By lake steamers of 2,000 tons maximum capacity, without breaking bulk from any of the lake ports, through the canal to the rivers about Pittsburgh; these steamers carrying miscellaneous freight, or iron ore and coal.

2. In boats of barge type of about 2,000 tons capacity, under their own power, from Lake Erie ports, where transfer cargo is received, through canal to rivers.

3. In boats of canal-lake barge type of approximately 2,200 tons capacity, in towed fleets, from lake ports, through canal to the rivers.

4. In towed canal-barge fleets, each barge having a unit capacity of 1,200 tons, from the canal Lake Erie port, where transfer cargo is received, through canal to the rivers.

The fourth or canal-barge fleet system is best suited to conditions obtaining on the connecting rivers, as it permits the business to be handled with greatest efficiency, separate barge loads being thereby best distributed to the various furnaces along the rivers, and coal fleets conveniently collected from the tipples; next in value comes the third system, then the second and finally the first.

The transfer cost of cargo at Lake Erie ports with modern loading and unloading appliances is relatively so small that the barge system is considered the most economical, both as to cost and time.

In arriving at this conclusion, it has been considered that although the furnaces may prefer large cargoes of ore, the coal mines can be better served by the smaller capacity barges, permitting the barges, when emptied of iron ore, to be quickly distributed to the various coal tipples for loading there, the tow-boat readily gathering up same, forming them into fleets. Also, the new Government locks built on the Monongahela River are arranged for fleets to be taken through at one lockage of the size here proposed, namely, one tow-boat and three barges, and it has been assumed that the unit fleet carries 3,600 tons. As some of the barges may be towed by cargo-carrying tow-boats, the assumption is that the full capacity of the fleet will reach 4,600 tons.

For convenience in calculation in making up the sample transportation statement, it has been estimated that 90 per cent. of the total canal tonnage, composed of iron ore and coal, will be conveyed by towed canal-barge fleets; the remaining amount of the tonnage to be carried by steamers, a portion of them also moving ore and coal and the rest miscellaneous, or package freight. The average cost of moving the tonnage as above by the combined systems, including profit to the vessels, has been estimated not to exceed 1.2 mills per ton mile.

Vessels coming through canal, to the rivers, will have a saving in fuel cost of over fifty cents per ton, which has not been considered in estimating operating costs.

The maximum draft for boats will be eleven feet.

For the purpose of calculation for the transportation statement, the following dimensions, tonnage capacity and costs of boats have been ascertained.

NUMBER OF VESSELS NECESSARY TO CARRY TONNAGE, VESSEL MAINTENANCE COST, AND RATE OF TRANSPORTATION BY COMBINED SYSTEM OF CANAL-BARGE FLEETS AND LAKE-CANAL STEAMERS.

Years of Canal Operation	Estimated Canal Tonnage	Number Barge Fleets (per year)	Number Steamers (per year)	Total Number Fleets and Steamers (per year)	Number Lockages (per day)	Time available per lockage (minutes)	Maintenance and Operation		Total cost including 15% on investment		Canal toll (cents)	Transfer cost (cents)	Rate per ton trip (cents)	Rate per ton mile (mills)
							Per ton trip (cents)	Per ton mile (mills)	Per ton trip (cents)	Per ton mile (mills)				
1	3,000,000	7	6	13	4	360	9.5	0.68	15.7	1.12	32.5	9.25	57.45	4.1
2	5,500,000	13	11	24	8	180	....	....	....	....	....	....	....	....
3	10,500,000	24	22	46	15	96	....	....	....	....	....	....	....	....
4	16,500,000	38	34	72	24	60	....	....	....	....	....	....	....	....
5	22,500,000	52	46	98	32	45	....	....	....	....	....	....	....	....
6	26,500,000	61	54	115	38	38	....	....	....	....	....	....	....	....
7	30,000,000	70	62	132	43	33	....	....	....	....	....	....	....	....
8	33,000,000	76	68	144	47	31	....	....	....	....	....	....	....	....
9	36,000,000	83	74	157	52	28	....	....	....	....	....	....	....	....
10	38,000,000	88	78	166	54	27	....	....	....	....	....	....	....	....

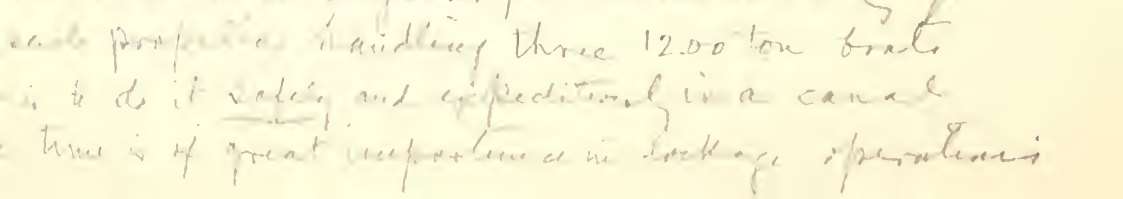
The cost and rate figures will decrease slightly with increase of tonnage.

A steamer for lake and canal, 250 by 40 feet, holding about 1,700 tons, if constructed for carrying ore and coal only, will cost about $105,000; if fitted up as a package freight and passenger steamer, approximately $140,000.

A steel canal-barge, 180 by 26 feet, of 1,200 tons capacity, will cost approximately $14,000, and a twin-screw tow-boat, built for light draft, strong enough for lake use, if desired, and to handle three barges, will cost about $60,000.

The canal, physically, will be modern in every respect, and navigation, with good management, can be operated in as business-like manner as trains over a railroad. Waterways in some parts of the world are now demonstrating this fact. With rapid handling facilities at the canal terminal points, tow-boats with barge fleets, making full allowance for detention at terminals, locks, etc., can make a round trip in 4.2 days, moving 7,200 tons. The average speed through actual canal and rivers, including stops, reduction of speed in meeting vessels and at curves, but not detentions at terminals, for the entire distance from the river commercial center on the Monongahela, to Lake Erie, 140 miles, will be approximately 3.25 miles per hour. The maximum speed in actual canal channel, 4 miles per hour; on rivers, 5 miles per hour. The maximum speed on the Ohio and Monongahela Rivers was averaged for up and down movement at 5 miles per hour.

The lake season has been gradually increasing for the past 20 years. For the last 5 years the average is 240 days. To be conservative, it is considered that boats will be actively engaged for an average period of 221 days annually, making due allowance for various time losses. According to this, one barge fleet, making 54 round canal trips, will carry per season, 388,000 tons, which amount is considerably greater than averaged on the lakes, even when considering the large ore and coal carrying vessels, hauling between the ore region and Lake Erie ports.



The steamer traveling, say, between Pittsburgh and Duluth, canal and lakes, 2,040 miles, can make the round trip in 13½ days, moving 3,400 tons, (the average used in the tabulated statements is 3,000 tons). It can make 16 round trips during the season, transporting 54,400 tons. The steamer round trip sailing time, now on the lakes, between Duluth and Ashtabula, 880 miles, is about 7 days, and 3 days are spent in port.

In the computation of cost of transport is included an equipment of vessels supposed to be held as a reserve, to those in active service, approximately as follows: Barges 1 to 2, tow-boats 1 to 6, steamers 1 to 12.

The operating expenses, including profit, for a barge fleet, is 0.94 mill per ton mile and is based partially upon similar fleets now working on the Monongahela River, but adjusted to the various controling conditions in making the trip of 140 miles, between river and lake.

The average operating cost for the ore, coal and package freight steamers, including profit, is 2.64 mills per ton mile, largely based upon the experience of similar vessels now navigating the lakes. Proper allowance is made for lock stops, detentions, etc., peculiar to canal and rivers.

PHYSICAL FEATURES.

The Lake Erie and Ohio River Ship Canal Company is in possession of information so reliable and extensive as to be in a position to state that the project is absolutely feasible from every viewpoint. The surveys made by this Company, for main canal extend from mouth of Beaver River, Pennsylvania, and touch Lake Erie at mouth of Indian Creek, Ohio; distance 103 miles. It has been found in making these surveys, including feeder lines and investigation for water supply, that the country through which the

canal is to be built is peculiarly well fitted by nature for the purpose, offering in great harmony and to a liberal degree, the necessary elements.

The Canal Commission of Pennsylvania in 1890 made a survey for a canal of 14 feet depth, via the Beaver and Shenango Rivers, joining Lake Erie at Conneaut, Ohio, near the state line of Pennsylvania. This route began at Davis Island Dam, 5 miles down stream from the wharves of Pittsburgh, followed along the Ohio River on the right bank and joined the Beaver a short distance above its mouth, was almost wholly within the State of Pennsylvania, of 123 miles' length, and passed over a summit necessitating a water surface elevation of 1016 feet above tide. The report was favorable, and indicated that the water supply from the immediate vicinity, tributary to that elevation, was sufficient to meet the demands of about 6,500,000 tons annually.

In 1895, under the auspices of the Chamber of Commerce of Pittsburgh a survey was made, also beginning at Davis Island Dam, which is at the lower end of the Pittsburgh harbor, via the Beaver and Mahoning Rivers to Ashtabula, Lake Erie. The length was 123 miles, and passed over a summit allowing a water surface elevation of 900 feet above tide. The water surface of the Pittsburgh harbor is 703 feet above mean tide. The investigations for a water supply extended far enough to find that sufficient was readily at hand to provide for an annual tonnage of 20,000,000. The route for this project, from the mouth of the Beaver to Lake Erie, also that for main feeder line, covered practically the same ground taken by the Lake Erie and Ohio River Ship Canal Company, excepting that the Lake terminal now chosen is seven miles further to the west.

THE ROUTE.

The City of Pittsburgh is situated at the head of the Ohio River, at the confluence of the Allegheny and Monongahela Rivers. The

improvement of the Monongahela, with locks and dams by the Government, is now extended 30 miles into West Virginia, making a total of 130 miles above Pittsburgh. The Allegheny River is similarly improved for 20 miles above the city, and to meet the clamor for more, canalization will undoubtedly be soon extended 20 or 30 miles further.

The Ohio River, as a part of the plan of canalization by the Government to the Mississippi River, has been improved to a point 30 miles below Pittsburgh. At places further down the river several locks and dams are nearly completed and others projected. The entrance to the proposed canal, the mouth of the Beaver River, is 25 miles below Pittsburgh, and therefore on the line of present improved river, having at this date unbroken connection with nearly 200 miles of modern improvement.

The Monongahela River and its branches drain the larger part of the bituminous coal fields in Southwestern Pennsylvania, and a considerable area in Northern West Virginia. Coal transported by river, is taken by boats direct from the mine tipples in the pools above the City of Pittsburgh.

The Ohio River, from a point about 50 miles below the Beaver River, penetrates the bituminous coal fields for a distance of about 300 miles. The Kanawha and Little Kanawha drain the field of Southern West Virginia, the former being canalized for a distance of 90 miles, and the latter 48 miles. The Muskingum, flowing through the coal field of Southewestern Ohio, is canalized for a distance of 84 miles. It, therefore, may be said that in the near future there will be nearly 700 miles of canalized river, navigable the whole year, passing through this vast Northern Appalachian field of coal, connecting with the proposed ship canal and the Great Lakes. Open river navigation obtains at the head of the branches for a portion of each year, which will considerably increase the above mileage.

A glance at the map will reveal the fact that the shortest possible route to be found, to connect the Ohio River with the Great Lakes, is the belt of country through which extends the survey made by the Lake Erie and Ohio River Ship Canal Company. Of the 103 miles' distance, not less than 49 per cent. will be formed by canalized rivers, which nature has placed on the direct line to Lake Erie. The divide between the Ohio River and Lake Erie basins is crossed at an elevation of 915 feet above sea, the lowest point to be found east of the State of Indiana, in which vicinity a canal to connect river and lake would have a length of about 250 miles, with the distance rapidly increasing in moving westward. It is thus possible to obtain by a cutting, of not great depth or length, largely through glacial drift, a water surface elevation for the summit level, 900 feet above sea, 116 feet lower than the summit found by the Pennsylvania Canal Commission, reducing the total lockage 232 feet. The available water supply area of the nearby sheds is very largely increased, as is the storage capacity.

The first division of the canal is formed by the Beaver River, length 20.5 miles. The second division is formed by the lower portion of the Mahoning, length 30 miles. The total rise for these divisions is 177 feet, requiring 12 locks to lift from the Government pool in the Ohio, whose surface is 668 feet above mean tide.

The Beaver River has an average surface width about three times that proposed for the canal. From the head of this stream a branch canal, by canalization of the Shenango River, is proposed, 25 miles long, reaching to the steel centers of New Castle and Sharon.

Another proposed branch, seven miles long, is from Niles, Ohio, to Warren, Ohio. Ten miles below Niles, Ohio, is the City of Youngstown, prominent as a steel center with the works scattered along the river banks for a distance of some miles. At Niles, which is also a producer of steel products, begins the actual canal, with

its general direction due north to Lake Erie. In the approach along Mosquito Creek Valley, to the summit, there is a rise of 55 feet requiring three locks. In the valley just mentioned, on the southern end of the summit, the topography being favorable, a lake is proposed 9.5 miles long. It forms about 30 per cent. of the summit length; due to its large capacity the advantages are: That it can act for short periods somewhat as an auxiliary reservoir to the levels below, will permit boats navigating and passing at high speed, and provide for them, at all times, an excellent place of harborage. The summit is 31 miles long and terminates 13 miles south of Lake Erie. On the descent of the lake escarpment, to the mouth of Indian Creek, Lake Erie, elevation 573 feet above mean tide, 18 locks must be provided with a total drop of 327 feet, which fall is the same as made with 25 locks on the Welland Canal between Lakes Erie and Ontario. The total lockage, up and down between river and lake, is 559 feet.

Alternate Route.

There is an alternate route from the Mahoning River to Lake Erie, diverging from the present one at Niles, keeping the river to a point above Warren, and then passing by a deep cut to the east slope of Grand River Valley, with a water surface in the actual canal on the same level as that in the Mahoning River, and extending this level to a point about 17 miles south of Lake Erie. The lake terminal would be the same as for the Mosquito Creek route. Although this diversion would cost about 5 million dollars more than the other route, and would be four miles longer, the favorable features are, that the summit could be 860 feet above tide, making 80 feet less lockage than the route via the Mosquito Creek, and 312 feet less than the one of the Pennsylvania Canal Commission. Also, the number of locks can be reduced by five, and the water supply and reservoir capacity considerably increased.

WATER SUPPLY.

On account of the phenomenal growth of tonnage in the canal and Great Lakes districts, constantly increasing each succeeding year in vast proportions, it has been considered necessary to provide in the estimates, at the start, for water sufficient to meet the demands of 38 million tons annually passing the summit. This tonnage is expected at the end of the tenth year of operation. The main supply is to be taken to the north end of the summit from the east, and another supply to the south end from the west, thus insuring not only a ready supply to each approach, but an unbroken one at all times, being received by separate feeders. The region from which the main supply is to be taken, from strong flowing tributaries of the Allegheny River in Pennsylvania, is deeply covered with glacial drift and alluvium, in places to 100 feet or more, the mass of material being heavily charged with ground water as indicated by tests, and by the streams during dry periods. At the source of many of the streams are to be found ponds and small lakes. In the upper basins the hills frequently attain heights of 1,700 feet and more above tide. The general rock floor slopes toward the canal, passing slightly under the bottom. Such, in general, is the character of the country from which will be drawn the main water supply.

The north feeder, broken into three parts by two reservoirs to be on its direct line, will have a total length of 45.7 miles. The main reservoir will cover a glacial swamp and have a capacity of 10,000,000,000 cubic feet. The south feeder of 34.5 miles length, starting from a reservoir, will receive water from tributaries of the Ohio River.

The total drainage area available to the summit level is nearly 6,000 square miles, the area considered necessary to draw upon to provide for a business of 38 million tons annually, is 2,240 square

miles. The average total annual rainfall for this section is about 39 inches. The annual depth of rainfall available from this area, taken largely from the flood stages, is 5.2 inches, supplying 27,211,-000,000 cubic feet, the amount actually needed is 24,084,400,000 cubic feet, from a depth of 4.6 inches. To properly control the water, to be taken from the streams during high stages, storage reservoirs are included in the project with an aggregate capacity of 72 per cent. of the needed supply. The topography is so formed that considerably more can be impounded, if found necessary as business increases.

The average season of navigation on the Great Lakes, basing upon 17 years, is 235 days. In computing for water supply, the season was made 245 days, to be conservative.

Table of annual rainfall at stations in this territory, compiled from United States Government and State reports, as follows:

PRECIPITATION ON WATERSHEDS.

Station	Years.	Minimum.	Maximum.	Mean.
		Inches.	Inches.	Inches.
Westfield, N. Y....	8	31.75	44.90	36.46
Volusia, "	5	40.71	47.10	43.31
Jamestown, "	8	41.97	52.72	39.60
Columbus, Penna..	7	36.43	64.49	45.55
Erie, "	31	28.36	55.20	39.88
Saegerstown, "	13	31.97	52.20	44.66
Greenville, "	4	28.43	36.99	39.55
Franklin, "	29	31.70	59.80	43.51
Oil City, "	23	22.80	50.62	42.06
Warren, "	20	32.05	58.20	43.34
Average		32.62	52.22	41.79
Youngstown, Ohio.	10	27.17	36.84	32.50
Warren, " ..	10	32.66	44.20	38.45
Garrettsville, " ..	21	30.60	46.08	38.63
Hiram " ..	15	31.69	45.71	39.50
Auburn, " ..	4	32.38	41.43	36.23

Station	Years.	Maximum. Inches.	Minimum. Inches.	Mean. Inches.
Lordstown,	" .. 10	27.65	43.27	34.98
Hudson,	" .. 26	30.90	55.00	40.08
Akron,	" .. 13	31.15	49.93	37.85
Atwater,	" .. 9	30.33	44.85	37.74
New Waterford,	" .. 10	33.98	49.60	42.66
Millport,	" .. 9	30.39	48.00	32.20
Greenhill,	" .. 12	28.77	47.80	37.59
Canton,	" .. 22	31.29	54.10	39.14
New Berlin,	" .. 11	24.09	45.73	34.47
Average		30.22	46.61	37.29

ESTIMATE OF COST.

Most of the prominent canals of the world have been enlarged within recent years, to meet the demands of expanding business in regions not to be compared with the conditions now obtaining, or future possibilities in this section of the country. Provision is therefore made in the estimate, particularly for important parts, with the idea to obviate the necessity of enlargement for many years after construction.

The canal prism is to be as follows: In earth, width at water surface 177 feet, bottom 131.25 feet, depth 13 feet; in rock, width at water surface, 155 feet, bottom 153 feet, depth 13 feet. The channel bottom width on the Beaver River to be 175 feet, and in the Mahoning, 150 feet, with a depth in each case not less than 13 feet.

The locks are to have a full chamber length of 400 feet, available length 360 feet, width 56 feet, and depth over sills of 12 feet, but so built that 15 feet may be easily obtained when desired. It is designed to have intermediate gates to use in locking through steamers and small craft.

The locks on the Ohio River now nearing completion have a length between quoins of 600 feet, width 110 feet, and depth over sills of 9 feet. The Monongahela River locks have a length and breadth

same as adopted for this canal, but the depth over sills 11 feet. That the Government will increase these depths, at the proper time, to conform to canal requirements there can be no doubt.

In estimating for cost of bridges, provision is made for a clearance between water surface and lowest member of bridge, of 45 feet on river division and 40 feet on canal proper. An exception to this occurs with several unimportant branch railroads, and one highway, where the bascule form of bridge is considered.

Regarding the harbor at entrance of canal to Lake Erie no cost is included, as the Government, following the policy employed for many years, will provide what is required beyond the water's edge. Inside the canal mouth estimates include a vertical sided channel 300 feet wide, 22 feet water depth, and a length back from the Government lake harbor to the first lock of 3,000 feet. Along this reach and on side basins or slips, the large lake vessels can be constantly engaged, during the season, delivering and receiving cargoes to and from the canal barges by the aid of rapid loading and unloading machines.

Right-of-way is averaged at 800 feet width for canal proper. For the Beaver River little land is necessary beyond sites for locks and landings. Along each bank of the Mahoning an average width of 150 feet is considered sufficient.

ESTIMATE.

Beaver Division (20.5 miles).

Excavation—		
Earth, 6,180,000 cubic yards	$ 1,545,000	
Rock, 874,000 cubic yards	2,185,000	
Bank Protection	34,000	
Basins	171,000	
Locks (5)	1,245,000	
Dams	303,000	
Bridges—		
Highway	161,000	
Railroad	134,000	
Right-of-way	50,000	
Damages	880,000	
		$ 6,708,000

Mahoning Division (30.3 miles).

Excavation—		
Earth, 11,580,000 cubic yards	$ 4,053,000	
Rock, 193,000 cubic yards	511,000	
Bank Protection	507,000	
Retaining Walls	552,000	
Basins	194,000	
Locks (7)	1,699,000	
Dams	233,000	
Bridges—		
Highway	618,000	
Railroad	1,804,000	
Right-of-way	249,000	
Damages	900,000	
		$11,320,000

Mosquito Creek, Summit and Lake Erie Divisions.

Excavation— (Canal Proper, 52.6 miles.)		
Earth, 17,100,000 cubic yards	$ 5,130,000	
Rock, 3,810,000 cubic yards	3,358,000	
Bank Protection	775,000	
Walls between locks	33,000	
By passes	60,000	
Culverts	70,000	
Spillways	60,000	
Locks, (18 lift, 1 guard)	4,610,000	
Bridges—		
Highway	2,114,000	
Railroad	1,303,000	
Mosquito Lake	492,000	
Right-of-way	215,000	
Damages	500,000	
		$18,720,000
Feeders— Water Supply.		
French Creek, 45.7 miles	$ 2,992,000	
Mahoning, 34.5 miles	981,000	
Reservoirs—		
Pymatuning, French Cr. Feeder	1,543,000	
Mill Creek, " " "	230,000	
Mahoning, Mahoning Feeder	970,000	
		$ 6,716,000
		$43,464,000
Engineering and Contingencies, 15%		6,520,000
		$49,984,000

UNIT PRICES.

Excavation, per cubic yard.		
Earth, dry canal proper	$ .30	
Earth, dry Beaver River	.25	
Earth, wet Mahoning River	.35	
Rock, dry	.75	
Rock, wet Beaver River	2.50	
Rock, wet Mahoning River	2.65	
Rock, (lake end) partly submerged, averaged	1.25	
Tunnel, earth	5.00	
Puddling, per cubic yard	.85	
Embankment, per cubic yard.		
Earth fill, reservoir dams	.35	
Earth fill, reservoir road crossings, etc	.30	
Earth fill, R. R. without interrupting traffic	.80	
Bank protection, per cubic yard	3.00	
Bridge, rivers and canal, per cubic yard.		
Earth excavation, dry	.30 to $	.40
Earth excavation, wet	.55	
Earth approach, highway, Beaver River	.50	
Earth approach, highway, Mahoning River	.40	
Earth approach, canal highway	.30	
Earth approach, railroad, Beaver River	.80	
Earth approach, railroad, Mahoning River	.65	
Concrete piers, railroad	10.00 to	12.00
Concrete, abutment	7.00	
Concrete, highway	6.00 to	10.00
Concrete, feeder culvert	6.00	
Superstructure, R. R., double, lin. ft	100.00 to	135.00
Superstructure, R. R., single, lin. ft	56.00 to	80.00
Superstructure highway, electric railroad, lin. ft.	50.00 to	70.00
Superstructure, highway, lin. ft	40.00 to	56.00
Feeders.		
Superstructure, highway, lin. ft	30.00 to	45.00
Superstructure, railroad	60.00	

Locks.		
Concrete, rivers, cubic yard	$ 6.50	
Concrete, canal, cubic yard	6.00	
Gates, per square foot, averaged	3.90	
Power plant, operating machinery	10,500.00	
Power house	3,400.00	
Tenders' house (2)	4,000.00	
Lighting, fittings, etc. (6 lights per lock)	1,500.00	
By passes	6,000.00	
Dams.		
Concrete, per cubic yard	6.50	
Movable top, lin. ft.	36.00 to	45.00
Sheet piling, per B. M	55.00	
Round piling, lin. ft.	.30	
Right of way, per acre.		
Beaver River	200.00 to	2,000.00
Mahoning River	150.00 to	3,000.00
Canal proper	50.00	
Feeders	50.00	
Land, per acre.		
Mosquito Lake	40.00	
Pymatuning Reservoir	15.00	
Small reservoirs	30.00	

CHARTER POWERS.

Powers of the most liberal nature to construct and operate a canal in Pennsylvania and Ohio have been granted by the legislatures of these States in a number of Acts of Assembly, and in accordance with this legislation, companies have been incorporated in both States. It is contemplated to merge the two companies and construct and operate the canal by the consolidated corporation.

In the Fifty-ninth Congress a law was enacted and approved June 30, 1906, incorporating the stockholders of the Pennsylvania corporation in to a ship canal company, under the same name and title, and with the same broad powers, so that the builders of the canal may have their choice to proceed under the authority of the Federal or State governments. The issuance of this charter by the National Government, a grant without precedent, ex-

cept in the cases of transcontinental railroads, is the highest evidence of the appreciation of the importance of this waterway to interstate commerce.

The Pennsylvania statute allows the issue of capital stock and the creation of such bonded indebtedness as may be necessary to accomplish the purpose of the Company. It permits the Company to preempt its right of way; to exercise the right of eminent domain; to alter and relocate highways, railroads, bridges and other works; to divert and impound what ever water supply may be necessary for the purpose of the enterprise; to occupy any river, stream or land; to construct and operate branch or lateral canals; to levy tolls; to connect with other canals or railroads; to carry on a transportation business, and in general to have all the liberal powers now exercised by railroad companies.

The Ohio laws give the same broad powers to the Company in that State which it enjoys in Pennsylvania.

The Act of Congress limits the issue of capital stock and indebtedness to eight hundred thousand dollars per mile, but in practically all other respects grants the corporation the same powers in construction and operation of the canal as the States through which it passes.

CONCLUSIONS.

A careful consideration of the practicability, cost, sources and development of business, economy and commercial necessity and possibility of earnings on capital required leads to the following conclusions.

1.—That the canal is practicable at reasonable cost and private capital may safely and profitably undertake to build it; all necessary powers are conferred by National and State Charters.

2.—That the canal will connect the greatest tonnage producing sections in the world; that about eighty per cent. of this tonnage is

product of mines; that tonnage of this character will seek water transportation, wherever provided.

3.—That the connection of the Great Lakes and the river systems of the country will be a greater factor in relieving congestion of traffic on the eastern half of our continent than any possible extension of railway facilities.

4.—That in no other part of the world can private capital undertake to provide transportation facilities either by rail or by water with so large present and immediately prospective business in sight to secure returns on the investment.

5.—That there is an absolute commercial necessity for the existence of this canal to co-operate with the railroads to handle the business which is coming and in sight, and which the railroads will not be able to take care of.

6.—That the canal can carry ore, coal and other low paying freight at about one-half the cost and rate necessary for the railroads, and that the railroads will have the amount of their high class freights and of their net profits materially increased by the construction of this canal.

MAPS ACCOMPANYING THIS PROSPECTUS.

Engineering Map; showing canal route, profiles, watersheds, cross sections, etc.

Industrial Map; manufacturing works and their location shown on the banks of the rivers, including numerical and alphabetical list of works.

Waterways Map; showing principal connecting waterways, bituminous coal fields, and iron ore regions.

APPENDIX.

APPENDIX.

OPINIONS ON NECESSITY OF WATERWAYS.

The great value of the Lake Erie and Ohio River Ship Canal, and of waterway communications in general, in the opinion of most competent authorities, will appear from the following quotations.

PRESIDENT ROOSEVELT'S OPINION.

President Theodore Roosevelt who signed the bill incorporating the Lake Erie and Ohio River Ship Canal Company, expressed the following views in his letter appointing the National Inland Waterways Commission:

It is common knowledge that the railroads of the United States are unable to move crops and manufactures readily enough to secure the prompt transaction of the business of the Nation, and there is small prospect of immediate relief.

Representative railroad men point out that the products of the Northern interior States have doubled in 10 years, while the railroad facilities have increased but one-eighth, and there is reason to doubt whether any development of the railroads possible in the near future will suffice to keep transportation abreast of production.

There appears to be but one complete remedy—the development of a complementary system of transportation by water.

The present congestion effects chiefly the people of the Mississippi valley, and they demand relief. When the congestion of which they complain is relieved, the whole Nation will share the good results.

GREAT TONNAGE FOR CANAL.

The report of the Committee on Railways and Canals of the United States House of Representatives, on the bill incorporating

the Lake Erie and Ohio River Ship Canal Company made February 15, 1905; among other things contained the following:

Taking into consideration the enormous tonnage of the districts directly connected by this canal, and the fact that more than three-fourths of the products of those districts are such as will seek transportation by a waterway, if provided, it is safe to assume that with this canal open for traffic it might reasonably be expected to do a business amounting to at least 25,000,000 tons annually.

While a portion of the commodities transported might require re-shipment at Lake Erie ports, the probabilities are that a line of boats would be constructed which would be able to load with coal or coke at the Ohio River and proceed directly to the lake ports of the Northwest, and in return bring ore from those ports directly to the furnaces along the Ohio and Allegheny rivers without reshipment, thus saving the cost to those commodities of dockage and transfer charges.

INCALCULABLE BENEFIT OF CANAL.

Congressman Joseph E. Ransdell, of Louisiana, President of the National Rivers and Harbors Congress, in an address before the Mississippi Valley Latin American Convention at New Orleans, April 6, 1906, said of this canal:

It would appear that if the canal is constructed there would be such a great reduction in freight rates on both coal and iron, these two items of such tremendous importance to every citizen of this Union, that the benefit resulting from this canal would be incalculable.

CANAL FEASIBLE AND NECESSARY.

Congressman John Dalzell, of Pittsburgh, in his speech on the Lake Erie and Ohio River Ship Canal bill in the National House of Representatives, February 26, 1906, said:

It is an old plan, a feasible plan, and a legal plan. Now, what is the necessity for it? The necessity for it is that we shall bring together two regions of this country of magnificent natural wealth, one the complement of the other, but separated by a brief space, a space however great enough to rob either region of the value for which it is dependent upon the other.

Upon the shores of Lake Superior, on the one hand, are to be found the richest and greatest iron deposits in the world. They are of a capacity incapable of measurement, of a quality of the first order. On the other hand, adjoining the Ohio River at its headwaters are the coal fields of inexhaustible resource.

There is more coal in the Pittsburgh seam than underlies all of England. Not far off are the neighboring equally inexhaustible coal fields of West Virginia and Ohio. This is a region filled with blast furnaces and rolling mills and steel works and every conceivable variety of industrial enterprise. Is it not apparent that if you lay the Lake Superior ore region alongside the Pittsburgh coal region you will have the factors of an industrial sovereignty which will challenge the world to produce its equal? It is for the purpose of bringing these two fields together and attaining to commercial and industrial supremacy that the people interested in this project are desirous of building this canal.

AN OUTLET FOR WEST VIRGINIA.

United States Senator Stephen B. Elkins, of West Virginia, in an address to the West Virginia Board of Trade at Charleston, on October 8, 1906, said:

There is more freight already carried by water and rail in and out of Pittsburgh, than is carried out of New York. At the last session of Congress, I favored and assisted all I could the framing of an Act incorporating a company to build a canal from Lake Erie to the Ohio River, at a point some thirty miles below Pittsburg. I believe this canal will be built, and when completed it will furnish an outlet by water for our coal, coke, and other products to all lake points as far as Duluth; then coal and coke and lumber, by this route, will come down the Big Sandy, Big and Little Kanawha and the Monongahela River, into the Ohio, and reach destination to all points by water.

CONTINUOUS INDUSTRIES ALONG CANAL.

Gov. A. L. Harris, of Ohio, in his speech before the Ohio Valley Improvement Association, at Portsmouth, Ohio, October 17, 1906, said:

I believe that a greater destiny awaits the canals of Ohio. All Europe is alive to the great importance of internal waterways as

necessary complements to railroad carriage, and is expending enormous sums of money for their improvement. Our neighboring State of New York, in reconstruction of her historic canals, is responding to the changed economic conditions of our modern commerce. Our intrepid Pittsburgh neighbors are proposing an entirely new canal construction of ample dimensions to connect Lake Erie with the waters of the Upper Ohio—and ambitious Chicago seeks an outlet for Lake Michigan to the Gulf of Mexico. * * * A canal,therefore, which brings into unison the two greatest transportation routes in the country must be of vast benefit to our people and to the whole country.

Thus we are put into easy, reliable and constant communication with almost every State in and east of the Mississippi Basin. We can as easily reach the seaboard at New York as at New Orleans. The iron ores of Lake Superior can be assembled with the coal from Pennsylvania, Kentucky, and West Virginia at all points of such a canal with equal cheapness. Ohio would possess unsurpassed facilities for the manufacture of iron and steel and for the prosecution of all kindred industries. It requires no stretch of the imagination to see one unbroken line of manufactories along the banks of such a waterway from river to lake.

JAMES J. HILL FOR WATERWAYS.

James J. Hill, President of the Great Northern R. R., in his letter to Gov. Johnson, of Minnesota, used the following significant language:

The business of the United States is today so congested that from every portion of the country arises clamor for relief. The railroads everywhere are taxed beyond their powers. * * *

Suppose that only 25 per cent. additional track, with necessary terminals and equipment, making 33 per cent. is to be built during the next five years; or, say, in round numbers, 75,000 miles of track, as the requirement for the country to meet immediate needs. No practical man would furnish the facilities required, including additional equipment and terminal facilities, for less than $75,000 a mile. The question of terminals alone is almost prohibitive. * * * Two remedies must be found. The prohibitory expenses now attached to enlargement of terminals at many points and the absolute lack of available space at any price may be met by a decentralization of traffic. There must be more ports for export, more interior market. A 15-foot canal or channel from St. Louis to New Orleans would go far-

ther to relieve the entire Middle West and Southwest than any other could be economically carried long distances only by water transpor- powerful tow-boat would carry from 30 to 40 trainloads.

WATERWAYS BENEFIT RAILROADS.

Major William L. Sibert, of the United States Army Engineer Corps, now a member of the Panama Canal Commission, who is familiar with this canal project, in an address made October, 1904, said:

Railroads are forced to charge for each 100 miles of transit of fuel about as much as its original cost loaded on cars. Successful manufacture with such fuel cost is often impossible. If, however, fuel or iron ore, or both can be transported in large quantities by water at about one-fourth of the railroad cost, then more manufacturers can afford to operate, which, of course, means a greater business for the railroads than would be possible without the water transportation.

Such are some of the considerations which influenced the advocates of waterways in the United States and have led them to the conviction that not only manufacturers, miners, and shippers of all classes of goods may be benefited by the construction of waterways, but that the railway companies may also participate in such benefits.

GREAT CANAL ADVANTAGES.

The Erie Canal in New York, now being deepened to 12 feet, at a cost of $101,000,000, is a sister project of The Lake Erie and Ohio River Ship Canal, and many deductions as to the former will apply to the latter. The report of the Committee on Canals of New York State says:

The inestimable benefits which have been derived from the Erie Canal in the past are not disputed by anyone. To it, more than to any other cause, is due the phenomenal growth and commercial supremacy of the City and State of New York. The tolls on this waterway have more than repaid the cost of construction, maintenance and operation; in addition it has paid over $360,000,000 of freight money within the limits of the State, and the disbursement of this money along the line of the canal has built up the great

interior cities from Buffalo to Albany, forming a continuous line of commercial centers, which has no counterpart in any other State. The growth of these cities in turn led to the construction of railroads paralleling the canal, and these by consolidation and scientific management have gradually reduced the cost of transportation during the last thirty years from an average of two cents per ton mile to about six mills per ton mile.

No one disputes these evident facts; but the question which now confronts us is whether the railroads, with their large capital and scientific management, their durable roadbeds, powerful locomotives, larger cars, greater train loads, greater speed, and more certainty of delivery, will be able now or in the early future to reduce the cost of transportation below what is possible on the canals. If they can do this, then it is obviously unwise and improper to expend any more public money upon a method of transportation which, however, important in the past, would no longer be able to compete with other and improved methods. The determination of this question seems to us to lie at the very foundation of the canal problem, and we have therefore given it our utmost attention.

After discussing this question and mentioning the different types of canal proposed, the report draws this conclusion:

We feel confident that the larger project will result in a transportation cost across the State of New York as low as that by the St. Lawrence canals, which constitute their chief rival at present, far less than any rate which is possible by railroad at any time within the immediate future, equal substantially to the results which could be obtained by a large barge canal or a ship canal, and, in short, would be a complete and permanent solution of the canal problem.

THE FRENCH CANALS.

Ex-Mayor Seth Low, of New York, some time ago said:

When in Europe some time ago I made the acquaintance of Captain Mahan, of the United States Navy, and in the course of conversation he told me that he had been spending a great deal of his time in making a study of what France has been doing in the development of her internal waterways, and he made this observation: That no one realizes the vast sum that France has expended within the last thirty years in developing her canal system and transportation; and among other details that were most interesting he cited certain instances which came to his knowledge where a rail-

road which was in private hands favored the construction of a canal which was parallel, and that it had done so because it realized that the canal could carry the bulkier freight which was of little value to the railroad, and thus relieve it, and let the railroad free to handle more freight on which it received a greater profit.

So we find in France, so far from abandoning their waterways, they have spent many millions of dollars in later years in making them modern. The same thing is going on in Germany. Nothing is so near the heart of the German Emperor than to develop the water facilities of Germany until Germany can profit by them as other countries are profiting by them.

ERIE CANAL'S GREAT PROFITS.

The following is taken from an article in the American Review of Reviews, in July 1903:

It was the Erie Canal which made New York the Empire State. The immense proportions of the commerce which passed over this waterway are shown by the fact that up to 1883, when tolls were abolished, it had turned into the state treasury $131,801,797.91. This sum exceeded the total cost of building, improvements, and maintenance by so large an amount that, if the balance had been turned into a special canal fund and invested at 4 per cent., it would now be very nearly sufficient to pay the entire cost of the proposed enlargement.

CANALIZATION HELPED RAILROADS.

The following is from an article by S. A. Thompson in the "Engineering Magazine" for July, 1902:

The canalization of the River Main from Mayence to Frankfort was completed in the latter part of the year 1886. As a result of this improvement, which gave a channel vastly better and deeper than was before available, the river traffic showed an increase of 64 per cent. in 1887, and a further gain of 42 per cent. in 1888.

Frankfort is abundantly supplied with railroads, having among others an independent line on each bank of the Main all the way to Mayence. Did these road go into bankruptcy or suffer a serious falling off in their traffic? On the contrary, their business increased 66 per cent. in 1887 and an additional 58 per cent. in 1888.

ROLES OF CANALS AND RAILROADS.

United States Consul General Mason, of Berlin, reports:

German statesmanship was among the first to foresee that the time would come when railways having reached their maximum extension and efficiency, there would remain a vast surplus of coarse, raw materials—coal, ores, timber, stone, and crude metals—which could be economically carried long distances only by water transportation, and that in a fully developed national system the proper role of railroads would be to carry passengers, and the higher class of merchandise manufactured from the raw staples, which the waterways brought to their doors.

WATERWAYS CREATE RAILROAD FREIGHT.

The distinguished statesman, M. de Freycinet, in making a report of a committee of the French Senate, said:

It is conceded that waterways and railways are destined not to supplant but to supplement each other. Between the two there is a natural division of traffic. To the railroad goes the least burdensome traffic, which demands regularity and quick transit; to the waterways gravitate the heavy freights of small value, which can only be transported where freights are low.

Waterways, by increasing traffic, are rather the auxiliaries than the competitors of railroads. In procuring for manufacture cheap transportation for coal and raw materials, **they create freights whose subsequent transportation gives profit to the railroads.**

GREAT PROFITS OF SUEZ CANAL

The Suez Ship Canal, opened in November 1869, cost originally about $85,000,000. Improvements in depth and width have increased the cost to about $100,000,000, or double the estimated cost of the Lake Erie and Ohio River Ship Canal. The New York "Tribune" of May 20, 1907, said of the Suez Canal:

The irony of commerce is typified at Suez. Years ago practical merchants and economists were sure the great canal could never be made to pay profits, if even operating expenses. Yet it has been nec-

essary to reduce the rate of tolls and thus reduce the receipts of the canal in order to keep the yearly net profits within the maximum of 25 per cent. permitted by the charter.

The latest such reduction was made, we believe, in 1905, the net profits of the preceding year having amounted to 26.2 per cent. and the latest reduction before that had been in 1903. * * * Further reduction, however, is probable. Indeed, it may be regarded as certain with the increase of commerce. In 1870, the tonnage was only 436,609, and the rate was $2.60 a ton. In 1905, it was 13,134,105, and the rate was $1.55 a ton. And trade with the East is advancing by leaps and bounds.

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National Charter

The Lake Erie and Ohio River Ship Canal Company

FRICK BUILDING
PITTSBURGH, PENNSYLVANIA

To accompany
Doc. Im.
HC625
L19A52
1907

NATIONAL CHARTER.

An Act to incorporate the Lake Erie and Ohio River Ship Canal, to define the powers thereof, and to facilitate interstate commerce.

[PUBLIC—No. 402.]

Be it enacted by the Senate and House of Representatives of the United States of Ameriea in Congress assembled, That to facilitate interstate commerce between the Great Lakes and the Ohio and Mississippi rivers, Edward J. Lloyd, George A. Kelly, junior, John H. Jones, Henry Buhl, junior, Thomas P. Roberts, William J. East, George W. Stewart, Emil Swensson, Charles A. Fagan, George M. Lehman, James W. Wardrop, Burd S. Patterson, and John E. Shaw, together with such persons as may become associated with them and their successors, are hereby created a body corporate under the name and style of "The Lake Erie and Ohio River Ship Canal Company," and by that name, style, and title shall have perpetual succession, may sue and be sued, plead and be impleaded, make and use a common seal; and said corporation shall have and possess full power and authority to construct, equip, maintain, and operate the canals with appurtenances hereinafter described, and with power to take, receive, acquire, purchase, hold, use, lease, sell, mortgage, encumber, charge, pledge, grant, assign, and convey all such real and personal property and rights of property as may be requisite and needed in and about the construction, equipment, maintenance, and operation of said canals or anything appertaining thereto. Said corporation is hereby vested with full and complete power to pledge, encumber, and mortgage any or all of its property and franchises for the purpose of raising, obtaining, and securing such funds or moneys as may be needed for the construction, equipment, maintenance and operation of said canals or anything appertaining thereto.

SEC. 2. That the company, in addition to the powers expressed or implied in this Act, shall have the right of eminent domain, which

shall be exercised as provided in the case of railroad and ship canal companies organized under the laws, respectively, of the States of Pennsylvania and Ohio.

SEC. 3. That the capital stock of the company shall not exceed four hundred thousand dollars per mile of canal proposed to be constructed, divided into shares of one hundred dollars each, and the bonded indebtedness authorized by this Act shall not exceed four hundred thousand dollars per mile of canal proposed to be constructed, so that the sum total of stock issued and bonded debt created shall not exceed eight hundred thousand dollars per mile of canal proposed to be constructed: *Provided, however,* That the amount of debt created by the issue of bonds shall in no case exceed the amount of stock subscribed for and paid in in money, or property at its fair value: *Provided further,* That in no event shall the stock issued and debt created be more than may be necessary to construct, equip, maintain, and operate said canals and works pursuant to and in compliance with all the provisions of this Act; and said company is hereby authorized to issue its bonds, secured by mortgage or deed of trust upon its property and franchises, and the same shall be a first and prior lien to all other claims or demands upon the company: *Provided further,* That all stock, bonds, and other evidences of indebtedness issued in excess of that allowed under the provisions of this Act shall be absolutely null and void.

SEC. 4. That no dividends shall be declared or paid whereby the capital of the company shall in any manner be reduced or impaired; nor shall any dividend be paid by the issue of additional capital stock or the creation of additional indebtedness.

SEC. 5. That the said company may from time to time set aside a portion of its net earnings to be a sinking fund for the redemption of its said bonds or securities, with or without unearned interest, at such times, in such proportion, and in such manner, by allotment or otherwise, as may be determined by the board of directors.

SEC. 6. That as soon as at least five thousand dollars of stock for every mile of canal proposed to be constructed is subscribed and paid for in cash, the incorporators named herein, or a majority of them, shall call a general meeting of the shareholders, to be held in

the city of Pittsburgh, Pennsylvania, for the purpose of electing a board of directors of said company, consisting of not less than nine of the shareholders, and of transacting any other business that may be done at a shareholders' meeting. At such meeting the shareholders shall decide by a majority vote of the capital stock represented, either in person or by proxy, the length of the term or terms of the directors, and if the majority decide to elect a portion of their directors for a term or terms longer than one year, it may and shall be legal for such company to divide the directors who are to be chosen into two, three, or four classes, and to elect the first class to serve for the term of one year, and the second, third and fourth classes to serve for two, three, or four years, respectively; and at all ensuing elections of such company the shareholders shall elect only the number of directors necessary to take the place of those whose term of office shall then expire, and such directors shall be elected for the longest term for which any class may have been elected as hereinbefore provided; and notice in writing signed by or on behalf of the incorporators, or a majority of them, fixing the date and place of holding the same, mailed, postage prepaid, to the post-office address of each shareholder not less than ten days previous to the calling of such meeting, shall be deemed sufficient notice of such meeting.

SEC. 7. That the directors of said company, a majority of whom shall constitute a quorum, shall hold office until their successors shall have been elected and qualified. They shall elect a president, secretary, and treasurer and may provide for such other officers and employes as may be deemed advisable, and may make by-laws for the control and management of the works, property, and business of the said company.

SEC. 8. That the main office of the company shall be at the city of Pittsburgh, in the State of Pennsylvania, and the annual meeting of the shareholders shall be held on the third Tuesday of January in each year.

SEC. 9. That Congress hereby reserves the right to regulate, as to interstate and foreign commerce, the tolls, fares, and rates to be charged by said company for the use of said canals; and the said company and the said canals and all interstate and foreign transportation thereon shall be subject to all the provisions of an Act en-

titled "An Act to regulate commerce," approved February fourth, eighteen hundred and eighty-seven, and all Acts supplemental thereto and amendatory thereof, now or hereafter enacted.

SEC. 10. That the company is hereby empowered to survey, ascertain, locate, fix, mark, and determine a route for a ship canal from some point on the Ohio River, between Beaver, Pennsylvania, and Pittsburgh, Pennsylvania; thence by the way of the Ohio, Beaver, and Mahoning rivers in the State of Pennsylvania, and the Mahoning River, in the State of Ohio, to a point at or near Niles, Ohio; thence northwardly through the State of Ohio to an accessible harbor on Lake Erie, between the Pennsylvania and Ohio State line and the mouth of the Grand River, in the State of Ohio, including said river, also a branch canal from the mouth of the Shenango River, in the State of Pennsylvania; thence along the Shenango River to a point at or near Sharon, Pennsylvania; also a branch canal from a point at or near Niles, Ohio; thence along the Mahoning River in the State of Ohio to a point at or near Warren, Ohio; and thereupon and therein to erect, construct, maintain, and operate such canals; the said main canal connecting the Ohio River and Lake Erie to be of such dimensions as to make and construct navigable channels of at least twelve feet in depth and having a standard cross section of not less than one thousand eight hundred square feet of area; to construct, maintain, and operate all such locks, dams, towpaths, basins, tunnels, aqueducts, feeders to supply water from any lakes, rivers, streams, or water courses, reservoirs, cuttings, apparatus, appliances, and machinery as may be necessary for the construction and operation of said canals; and such locks on such main canals shall not be less than three hundred and forty feet long between quoins, not less than forty-five feet wide between lock walls, and not less than twelve feet depth of water over miter sills, and between the Ohio River and Lake Erie the total lockage shall not exceed six hundred feet.

SEC. 11. That the said company, in the exercise of its right of eminent domain as granted in section two of this Act may, at its own expense and subject to and in conformity with the laws of the States, respectively, through which said canals may be constructed, enter upon and take such lands as are necessary and proper for the

making, maintaining, and operating of the canals, feeders, and other works of the company hereby authorized, and it shall have the authority, at its own expense and subject to and in conformity with the laws of the States, respectively, through which said canals may be constructed, to alter any and all highways, waterways, railroads, and other works, either public or private, necessary for the making, maintaining, and operating of the canals, feeders, and other works of the company.

SEC. 12. That the said company in the exercise of its rights of eminent domain as granted in section two of this Act may, subject to the rights of and in conformity with the laws of the States, respectively, through which said canals shall pass, or any of the municipalities thereof affected thereby, to regulate and control the same, obtain, take, and use for the construction and operation of the said canals, feeders, and other works from the rivers, lakes, brooks, streams, water courses, ponds, reservoirs, and other sources of water supply sufficient water for the purpose of constructing, maintaining, operating, and using the said canals, feeders, and other works hereby authorized; control and regulate the flood waters of the Allegheny River above Franklin, Pennsylvania, and the Beaver Mahoning, Grand, Ashtabula, Shenango, and Little Shenango rivers, and Sandy Creek, and the tributaries of said streams by regulating dams, weirs, reservoirs, and impounding dams, and divert, alter, or impound the waters of any river, lake, brook, stream, and the tributaries of said streams or water courses when the same is necessary to the making, maintaining, and operating of the said canals, feeders, and other works hereby authorized: *Provided*, That nothing herein contained shall authorize said company to impair the navigability of any river or stream, or to diminish at any time the water supply of any city, village, or municipality below the reasonable requirements of such city, village or municipality, or in any manner pollute the same: *Provided*, That no water shall be drawn for the purpose of said canal, its branches, or feeders, from above Niagara Falls, either from Niagara River or its tributaries, unless approved and allowed by the Secretary of War: *And provided*, That no greater amount of water shall be diverted from Niagara River or its tributaries above Niagara Falls than shall be specified in any general law of the United States limiting the same.

SEC. 13. That the said company may construct, maintain, acquire, operate, and lease, or otherwise dispose of the terminals, docks, harbors, piers, wharves, elevators, warehouses and appurtenances, and telegraph and telephone lines along the said canals that may be necessary or useful in the construction, operation and maintenance thereof, and may acquire or make any vessel, craft, mechanism, or appliance whatsoever necessary for constructing, maintaining, and operating said canals, and use, lease, or dispose of the same; and develop, acquire, use, and dispose of any motive power whatsoever in connection with or as part of the works herein authorized.

SEC. 14. That the said company, subject to and in conformity with the laws of the respective States through which said canal is constructed, may take, use, occupy, and hold, but not alienate, so much of the public beach or beach road, or lands covered with the waters of the rivers, lakes, brooks, streams, water courses, reservoirs, or ponds, on or at which the said canals may start from, traverse, cross, or terminate as may be necessary for the wharves, docks, piers, buildings, feeders, or other works of the company, and may also construct such works as may be necessary to improve the navigation of said rivers and to stop the waste of waters therefrom and economize and utilize the same for the uses herein provided for.

SEC. 15. That the company shall prepare and file with the Secretary of War, for his approval, the plans, locations, dimensions, and all necessary particulars of its canals, feeders and other works betwen the Ohio River and Lake Erie, and before such approval the construction thereof, shall not be begun; and should any change in said plans be proposed during the progress of construction, such change shall be submitted to the Secretary of War and be by him approved before such change shall be made. Upon notice of the approval of the Secretary of War, the company may forthwith begin construction of its canals, feeders, and other works, or any part thereof, according to this Act.

SEC. 16. That the said company, at its own expense, shall maintain on its works, from sunset to sunrise, during the season of navigation, such lights and signals as may be prescribed by the United States Light-House Board.

SEC. 17. That the said canals shall be open to the use and navi-

gation of all suitable and proper vessels or other water craft, by whomsoever owned or operated, upon fair and equal terms, conditions, rates, tolls, and charges; and the said company may demand, take, and recover for its own proper use, for all persons and things of whatsoever description transported upon the said canal, feeders, and other works, or in vessels and craft using the same, just and reasonable charges, rates, and tolls; but all such charges, rates, and tolls shall be equal to all persons, vessels, and goods under certain classifications to be established by the company and approved by the Inter State Commerce Commission; and no rebate, reduction, drawback, or discrimination of any sort on such charges, rates, and tolls shall ever be made directly or indirectly. And the said charges, rates, and tolls for the ensuing year shall be fixed, published, and posted on or in every place where they are to be collected, on or before the fifteenth day of February of each year, and shall not be changed except after thirty days' public notice, which notice shall plainly state the changes proposed to be made in the charges, rates, and tolls then in force and the time when the changed charges, rates, and tolls will go into effect; and the proposed changes shall be shown by printing new schedules or shall be plainly indicated upon the schedules in force at the time and kept open to public inspection: *Provided*, That the Inter State Commerce Commission may, in its discretion and for good cause shown, allow changes upon less notice than herein specified or modify the foregoing requirements in respect to publishing and posting of such schedules, either in particular instances or by a general order applicable to special or peculiar circumstances or conditions.

SEC. 18. That the canals, feeders, and other works hereby authorized shall be lawful military and post routes, which the United States may forever use for the transmission of mails, dispatches, troops, munitions of war, supplies, and public stores, at fair and reasonable rates of compensation not exceeding that paid by private parties for the same service.

SEC. 19. That if the construction of the main canal hereby authorized shall not have been commenced, and a sum equal to ten per centum of the capital stock of the company shall not have been expended thereon within three years after the passage of this Act, or

if the main canal shall not have been finished within ten years after the passage of this Act, the franchise herein granted shall cease and be null and void; but in calculating the time aforesaid delays caused by the acts of God or the public enemy shall not be included.

SEC. 20. That any person, association, or corporation, municipal or otherwise, which shall suffer any damage or loss to person or property by reason of the construction, operation, or maintenance of the said canals, feeders, or any of the works thereof, by reason of the exercise of any of the powers herein conferred or shall have any right of action against said company or its property, shall be entitled to all the rights and remedies therefor allowed by the laws of the State wherein said injury was suffered or loss sustained, or right of action accrued, and any action therefor may be brought in the courts of the State having jurisdiction thereof.

SEC. 21. That the said company when exercising the right of eminent domain shall proceed under the laws and in the courts of the State where the property sought to be condemned is located.

SEC. 22. That the corporation hereby created shall be subject in the respective States in which it does business, to taxation upon its property and franchises as are other corporations.

SEC. 23. That nothing contained in this Act shall be construed as creating a liability upon the United States for the payment of the stocks, bonds, or other indebtedness of the corporation hereby created. Nor shall it be construed as imposing an obligation upon the United States to purchase, take charge of, or operate the canal herein named.

SEC. 24. That the right to amend, modify, or repeal this Act is hereby reserved by Congress.

Approved, June 30, 1906.

COMPILED FROM MAPS OF NEW YORK STATE
ENGINEER AND U.S. GEOLOGICAL SURVEY
SEPTEMBER 10, 1904
CANADA
LAKE SUPERIOR
DULUTH
MINNESOTA
N. DAKOTA
S. DAKOTA
ST. PAUL
WISCONSIN
L. MICHIGAN
L. HURON
L. ERIE
L. ONTARIO
TORONTO
OTTAWA
MONTREAL
KINGSTON
ROCHESTER
BUFFALO
ALBANY
NEW YORK
VERMONT
NEW HAMP.
MAINE
PORTLAND
BOSTON
MASS.
CONN.
NEWPORT
HARTFORD
MILWAUKEE
CHICAGO
DETROIT
TOLEDO
CLEVELAND
PITTSBURG
HARRISBURG
PHILADELPHIA
NEW JERSEY
DELAWARE
MARYLAND
BALTIMORE
WASHINGTON
VIRGINIA
RICHMOND
NEBRASKA
IOWA
DES MOINES
OMAHA
KANSAS
KANSAS CITY
ST. LOUIS
MISSOURI
INDIANA
INDIANAPOLIS
COLUMBUS
CINCINNATI
LOUISVILLE
KENTUCKY
WEST VIRGINIA
CAIRO
NASHVILLE
TENNESSEE
NORTH CAROLINA
MEMPHIS
ARKANSAS
LITTLE ROCK
S. CAROLINA
WILMINGTON
CHARLESTON
ATLANTA
GEORGIA
SAVANNAH
MISSISSIPPI
ALABAMA
BIRMINGHAM
MOBILE
TALLAHASSEE
FLORIDA
BATON ROUGE
NEW ORLEANS
HOUSTON
TEXAS
TAMPA
GULF OF MEXICO
ATLANTIC OCEAN
ACTUAL CANAL
PROPOSED CANAL
CANALIZED RIVER
CANALIZED RIVER PROPOSED
NAVIGABLE "
PITTSBURG COAL BED
LOWER COAL BEDS
IRON ORE FIELDS
1 LAKE ERIE AND OHIO RIVER SHIP CANAL
2 SAULT ST MARIE CANAL
3 NEW YORK BARGE CANAL
4 WELLAND CANAL
5 MONONGAHELA RIVER
6 KANAWHA RIVER
7 LITTLE KANAWHA RIVER
8 MUSKINGUM RIVER
MAP SHOWING LOCATION
OF PROPOSED
LAKE ERIE AND OHIO RIVER SHIP CANAL
AND CONNECTING WATER WAYS
IRON ORE REGION OF LAKE SUPERIOR
AND THE
BITUMINOUS COAL FIELDS
(APPALACHIAN)
SCALE MILES
0 25 100 200
G.M.L.

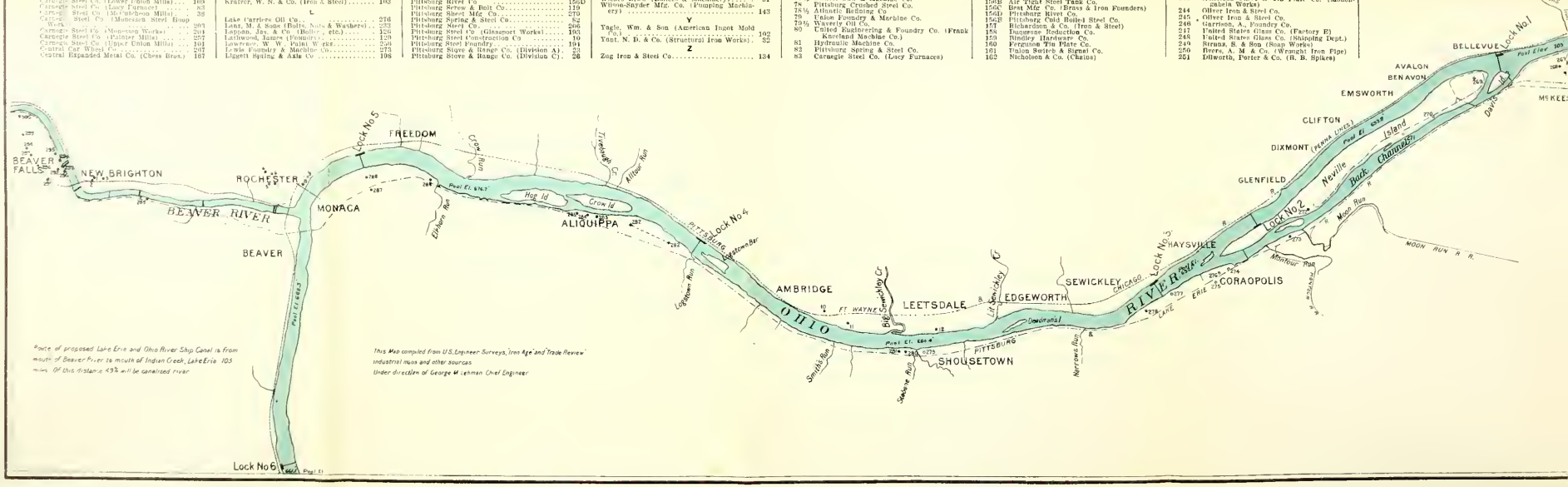
LIST OF MANUFACTURING WORKS

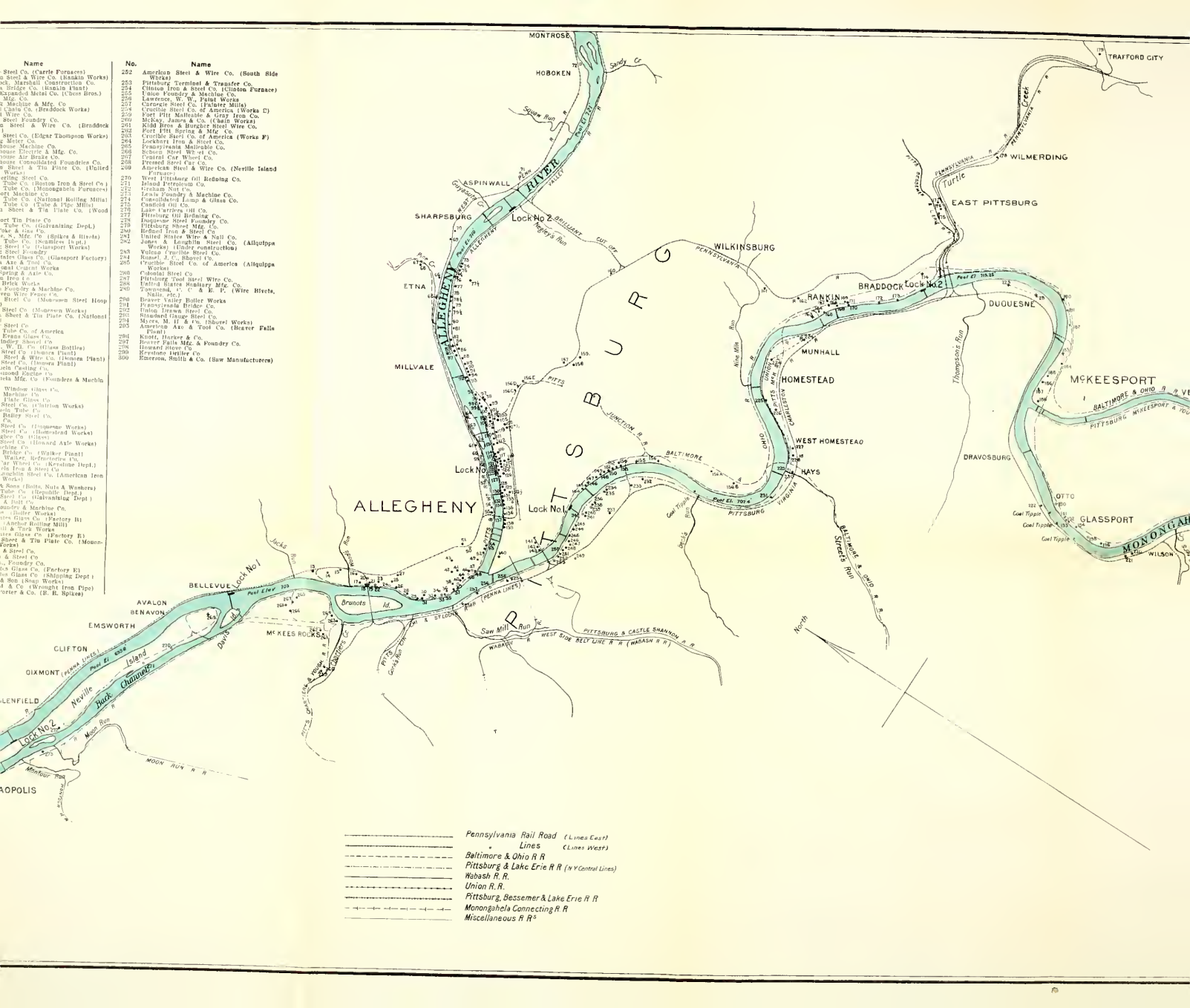
ALPHABETICAL

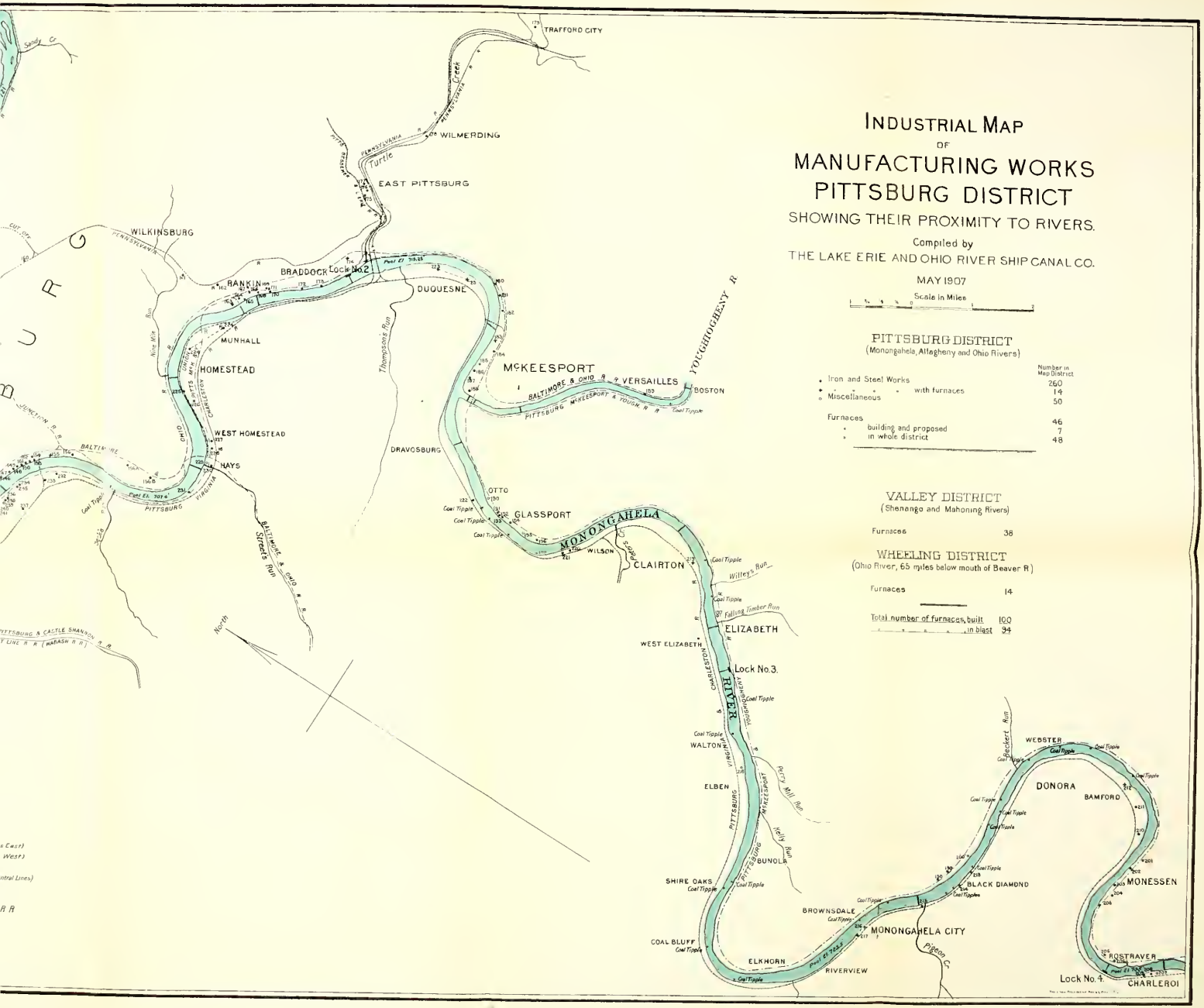
Name	No.
A	
Acheson Mfg. Co.	163
Acme Foundry Co.	764½
Air Tight Steel Tank Co.	1568½
A Sree, Chester B. (Iron Works)	240
Allegheny Galvanizing Co.	132
Allegheny Light Co.	132
Allegheny Steel Band Co.	136
American Axe & Tool Co. (Beaver Falls Plant)	196
American Bridge Co. (Ambridge Works)	205
American Bridge Co. (Keystone Plant)	11
American Bridge Co. (Shaffer Works)	84
American Bridge Co. (Walker Plant)	226
American Foundry & Construction Co.	106A
American Locomotive Co. (Pittsburg Locomotive & Car Works)	25
American Sheet & Tin Plate Co. (Monongahela Works)	243
American Sheet & Tin Plate Co. (National Works)	205
American Sheet & Tin Plate Co. (Star Works)	136
American Sheet & Tin Plate Co. (United States Works)	180
American Sheet & Tin Plate Co. (Wood Dept.)	187
American Smelting & Refining Co.	153
American Spiral Spring Co.	243
American Steel Foundries	127
American Steel Foundries (Reliance Steel Casting Co.)	97
American Steel & Wire Co. (Braddock Works)	173
American Steel & Wire Co. (Isabella Plant)	213
American Steel & Wire Co. (Edith Furnace)	19
American Steel & Wire Co. (Neville Island Furnace)	209
American Steel & Wire Co. (Rankin Works)	164
American Steel & Wire Co. (Shoenberger Works)	131
American Steel & Wire Co. (South Side Works)	252
American Steel & Wire Co. (120th St. Works)	116
American Supply Co. (Boiler Compounds)	119
American Window Glass Co.	210
Anchor Nail & Tack Works	241
Armstrong Cork Co.	122
Atlantic Refining Co.	78½
B	
Barrett, R. E. Mfg. Co. (Roofing)	46
Baker Fan, Mfg. & Foundry Co.	237
Beaver Valley Boiler Works	200
Beaver Valley Glass Co.	7
Belle, J. A. Salt Works	34
Best Mfg. Co. (Brass & Iron Founders)	121
Best Mfg. Co. (Brass & Iron Founders)	156½
Best Mfg. Co. (Pattern Shop)	98
Bidwell Hardware Co.	160
Black Diamond Engine Co.	214
Bovaird & Seyfang Mfg. Co. (Hardware)	142
Braddock Machine & Mfg. Co.	160
Brown & Co. (Steel)	137
Bryce Higbee Co. (Glass)	270
Byers, A. M. & Co. (Wrought Iron Pipe)	250
C	
Canfield Oil Co.	276
Carbon Steel Co.	241
Carnegie, Thomas, Sons Co. (Machinery)	61
Carnegie Steel Co. (Carrie Furnaces)	163
Carnegie Steel Co. (Clinton Works)	210
Carnegie Steel Co. (Clark Mill)	160
Carnegie Steel Co. (Duquesne Plant)	240
Carnegie Steel Co. (Homestead Plant)	212
Carnegie Steel Co. (Duquesne Works)	223
Carnegie Steel Co. (Edgar Thompson Works)	174
Carnegie Steel Co. (Galvanizing Dept.)	235
Carnegie Steel Co. (Butterworth Works)	224
Carnegie Steel Co. (Howard Axle Works)	226
Carnegie Steel Co. (Isabella Furnaces)	205
Carnegie Steel Co. (Lower Union Mills)	169
Carnegie Steel Co. (Lucy Furnaces)	183
Carnegie Steel Co. (Morrisdale Mines)	38
Carnegie Steel Co. (Monessen Steel Hoop Works)	207
Carnegie Steel Co. (Monessen Works)	244
Carnegie Steel Co. (Painter Mills)	257
Carnegie Steel Co. (Upper Union Mills)	161
Central Car Wheel Co.	287
Central Expanded Metal Co. (Chess Bros.)	167

NUMERICAL

No.	Name
1	Dameseus Crucible Steel Co.
2	Standard Horse Nail Co.
3	Standard Sanitary Mfg. Co.
4	Rochester Mold & Machine Co.
5	Beaver Valley Glass Co.
6	Fry, H. C. Glass Co.
7	Pittsburg Bridge & Iron Works
8	Ohio Stove Co.
9	Spencer Tumbler Works
10	Pittsburg Steel Construction Co.
11	American Bridge Co. (Ambridge Works)
12	Riter-Conley Mfg. Co. (Steel Construction)
13	Pittsburg Forge & Iron Co.
14	Pressed Steel Car Co. (Allegheny Works)
98	Best Mfg. Co. (Pattern Shop)
98A	Pittsburg Engine & Equipment Co.
99	Pittsburg Malleable Iron Co.
99½	Keystone Mfg. Co. (Steel Construction)
100	Carnegie Steel Co. (Clark Mill)
101	Carnegie Steel Co. (Upper Union Mills)
102	Yagle, Wm. & Son (American Ingot Mold Co.)
103	Kratzer, W. N. & Co. (Iron & Steel)
104	National Tube Co. (National Rolling Mills)
105	Iron City Tool Works
106	National Supply Co. (Oil & Gas Well)
107	Crucible Steel Co. of America (Works A)
107A	Ward-Mackey Co. (Bread, etc.)
108	Pittsburg Gage & Supply Co.
109	Carnegie Steel Co. (Lower Union Mills)
110	Serrance, S. P. Mfg. Co. (Spikes & Rivets)
111	National Tube Co. (Seamless Dept.)
112	Pittsburg Mfg. Co. (Bolts, Nuts, etc.)
113	Reliance Steel Co. (Shoupert Works)
113	Marshall Foundry & Structural Co. (American Ingot Mold Co.)
114	Pittsburg Valve, Foundry & Construction Co.
115	United Engineering & Foundry Co. (Mesbill & Co. Dept.)
116	American Sheet & Wire Co. (26th St. Works)
117	Ridway Steel Springs Co. (French Works)
118	Taylor & Boyd (Malleable Ornamental Iron Work)
119	Pittsburg Screw & Bolt Co.
120	Rogg, A. George, Iron & Steel Foundry Co.
121	Best Mfg. Co. (Brass & Iron Founders)
122	Armstrong Cork Co.
123	Phillips & Mehaffey (Founders)
124	Monroe, R. & Sons (Boiler Works)
125	Hartbeen, William, Refractories Co.
126	Lappan, James & Co. (Boilers, etc.)
127	American Steel Foundries
128	Crucible Steel Co. of America (Works B)
129	Latrobe, James (Foundry)
130	Oil Well Supply Co.
130A	Standard Underground Cable Co.
131	American Steel & Wire Co. (Shoenberger Works)
132	Allegheny Light Co.
133	Consolidated Ice Co.
134	Zug Iron & Steel Co.
135	Mackintosh, Hemphill & Co. (Machinery, Castings, etc.)
136	American Sheet & Tin Plate Co. (Star Works)
137	Brown & Co. (Steel)
138	Pittsburg Steel Co. (Monessen Hoop Co.
139	Nuttal, R. D. Co. (Machinery)
140	Rees, James & Sons Co. (Engines & Boilers)
141	Jones & Laughlin Steel Co. (Warehouse)
142	Bovaird & Seyfang Mfg. Co. (Hardware)
143	Wilson-Snyder Mfg. Co. (Pumping Machinery)
144	National Tube Co. (Pennsylvania Dept.)
145	National Tube Co. (Pittsburg Dept.)
146	Carnegie Steel Co. (Edgar Thompson Works)
147	Hussey, C. O. & Co. (Copper)
148	Fort Pitt Iron & Steel Co. (Keystone Plant)
149	American Supply Co. (Boiler Compounds)
150	Carnegie Steel Co. (Galvanizing Dept.)
151	Maloney Mfg. Co.
152	Keystone Rolling Mill
153	American Smelting & Refining Co.
154	Hubbard & Co. (Shovels & Tools)
155	Jones & Laughlin Steel Co. (Ellen Furnace)
156	National Tube Co. (Continental Dept.)
156A	American Foundry & Construction Co.
156B	Air Tight Steel Tank Co.
156C	Best Mfg. Co. (Brass & Iron Founders)
156D	Pittsburg Rivet Co.
156E	Pittsburg Cold Rolled Steel Co.
157	Richardson & Co. (Iron & Steel)
158	Duquesne Reduction Co.
159	Bindley Hardware Co.
160	Ferguson Tin Plate Co.
161	Union Switch & Signal Co.
162	Nicholson & Co. (Chains)
163	Carnegie Steel Co. (Carrie Furnaces)
164	American Steel & Wire Co. (Rankin Works)
166	McClintock-Marshall Construction Co.
167	Columbia Bridge Co. (Rankin Plant)
168	Central Expanded Metal Co. (Chess Bros.)
169	Acheson Mfg. Co.
170	Braddock Machine & Mfg. Co.
171	Orlando Wire Co.
172	Sterling Steel Foundry Co.
173	American Steel & Wire Co. (Braddock Works)
174	Carnegie Steel Co. (Edgar Thompson Works)
175	Pittsburg Meter Co.
176	Westinghouse Machine Co.
177	Westinghouse Electric & Mfg. Co.
178	Westinghouse Air Brake Co.
179	Westinghouse Consolidated Foundries Co.
180	American Steel & Wire Co. (United States Works)
181	Shenango Furnace Co.
182	National Tube Co. (Boston Iron & Steel Co.)
183	Carnegie Steel Co. (Lucy Furnaces)
184	McKeesport Machine Co.
185	National Tube Co. (National Rolling Mills)
186	Consolidated Lamp & Glass Co.
187	American Sheet & Tin Plate Co. (Wood Dept.)
188	McKeesport Tin Plate Co.
189	Duquesne Steel Foundry Co.
190	Pittsburg Steel Mfg. Co.
191	Reliance Iron & Steel Co.
192	National Tube Co. (Spikes & Rivets)
193	Pittsburg Steel Co. (Monessen Works)
194	Carnegie Steel Co. (Monessen Steel Hoop Works)
195	American Sheet & Tin Plate Co. (National Works)
196	Pittsburg Steel Co.
197	American Axe & Tool Co.
198	Interstate Forging & Foundry Co. (Mesbill & Co. Dept.)
199	Lincoln Spring & Axle Co.
200	Coulston Iron Co.
201	Shenango Furnace & Machine Co.
202	Pace Woven Wire Fence Co.
203	Carnegie Steel Co. (Monessen Steel Hoop Works)
204	Carnegie Steel Co. (Monessen Works)
205	American Sheet & Tin Plate Co. (National Works)
206	Pittsburg Steel Co.
206½	Seamless Rolled Ring Co.
207	Macbeth, Evans Glass Co.
208	Pittsburg-Bingley Mfg. Co.
209	Hamilton, W. D. Co. (Glass Bottles)
210	Carnegie Steel Co. (Bessers Plant)
211	American Steel & Wire Co. (Bessers Plant)
212	Carnegie Steel Co. (Duquesne Plant)
213	Monongahela Casting Co.
214	Black Diamond Engine Co.
215	Monongahela Mfg. Co. (Founders & Machinists)
216	American Window Glass Co.
217	Robinson Machine Co.
218	Pittsburg Plate Glass Co.
219	Wrought Iron Bridge Co. (Shalfron Works)
220	Monongahela Tube Co.
221	Meeris & Bailey Steel Co.
222	Goff Mfg. Co.
223	Carnegie Steel Co. (Duquesne Works)
224	Carnegie Steel Co. (Homestead Works)
225	Bryce, Higbee Co. (Glass)
226	Carnegie Steel Co. (Howard Axle Works)
227	Meeds Machine Co.
228	American Bridge Co. (Walker Plant)
229	Hartbeen, Walker, Refractories Co.
230	National Car Wheel Co. (Keystone Dept.)
231	Monongahela Iron & Steel Co.
232	Carnegie Steel Co. (Isabella Furnaces)
233	Standard Mfg. Co.
234	Pittsburg Valve, Foundry & Construction Co.
235	Carnegie Steel Co. (Galvanizing Dept.)
236	Neely Nut & Bolt Co.
237	Fischer Foundry & Machine Co.
238	Rees, James & Sons Co. (Foundry D)
239	Pittsburg Steel Co. (Monessen Works)
240	Neal Bros (Anchor Rolling Mill)
241	Anchor Nail & Tack Works
242	United States Glass Co. (Factory H)
243	American Sheet & Tin Plate Co. (Monongahela Works)
244	Oliver Iron & Steel Co.
245	Oliver Iron & Steel Co.
246	Garrison, A. Foundry Co.
247	United States Glass Co. (Factory E)
248	United States Glass Co. (Shipping Dept.)
249	Struna, S. & Son (Soap Works)
250	Byers, A. M. & Co. (Wrought Iron Pipe)
251	Dilworth, Porter & Co. (B. B. Spikes)
252	American Steel & Wire Co. (South Side Works)
253	Pittsburg Terminal & Transfer Co.
254	Clinton Iron & Steel Co. (Clinton Furnace)
255	Union Foundry & Machine Co.
256	Lawrence, W. W., Paint Works
257	Carnegie Steel Co. (Painter Mills)
258	Crucible Steel Co. of America (Works C)
259	Fort Pitt Malleable & Gray Iron Co.
260	McKay, James & Co. (Chain Works)
261	Kidd Bros. & Laughlin Steel Wire Co.
262	Fort Pitt Spring & Mfg. Co.
263	Crucible Steel Co. of America (Works F)
264	Lockhart Iron & Steel Co.
265	Pennsylvania Malleable Co.
266	Schoen Steel Wheel Co.
267	Central Car Wheel Co.
268	Pressed Steel Car Co.
269	American Sheet & Wire Co. (Neville Island Furnace)
270	Fort Pitsburg Oil Refining Co.
271	Inland Petroleum Co.
272	Graham Nut Co.
273	Lewis Foundry & Machine Co.
274	Consolidated Lamp & Glass Co.
275	Canfield Oil Co.
276	Lake Carriers Oil Co.
277	Pittsburg Oil Refining Co.
278	Duquesne Steel Foundry Co.
279	Pittsburg Steel Mfg. Co.
280	Bellaire Iron & Steel Co.
281	United States Wire & Nail Co.
282	Jones & Laughlin Steel Co. (Aliquippa Works) (Under construction)
283	Vulcan Crucible Steel Co.
284	Bissell, J. C., Shovel Co.
285	Crucible Steel Co. of America (Aliquippa Works)
286	Colonial Steel Co.
287	Pittsburg Tool Steel Wire Co.
288	United States Sanitary Mfg. Co.
289	Monessen Foundry & Machine Co.
290	Beaver Valley Boiler Works
291	Pennsylvania Bridge Co.
292	Union Drawn Steel Co.
293	Standard Gauge Steel Co.
294	Meeris, M. H. & Co. (Shovel Works)
295	American Axe & Tool Co. (Beaver Falls Plant)
296	Knott, Harker & Co.
297	Beaver Falls Mfg. & Foundry Co.
298	Howard Stove Co.
299	Keystone Driller Co.
300	Emerson, Smith & Co. (Saw Manufacturers)


BEAVER FALLS
NEW BRIGHTON
ROCHESTER
BEAVER RIVER
BEAVER
MONACA
FREEDOM
Lock No 5
Crows Run
Traverstown
Allther Run
Hog Id
Crow Id
Elkhorn Run
ALIQUIPPA
Lock No 6
Pool El
PITTSBURG
Lock No 4
Logstown Bar
Logstown Run
OHIO
AMBRIDGE
LEETSDALE
Montour Run
Coraopolis Cr
Lock No 3
SEWICKLEY
CHICAGO
EDGEWORTH
HAYSVILLE
Lock No 2
Neville Island
Back Channel
Montour Run
CORAOPOLIS
ERIE
Pool El 694.9
Pool El 684.4
Pool El 676.7
Pool El 668.3
Smiths Run
Sawmill Run
Narrows Run
SHOUSETOWN
PITTSBURG
CLIFTON
DIXMONT (PENNA LINES)
GLENFIELD
EMSWORTH
AVALON
BENAVON
BELLEVUE
Lock No 1
Pool Elev 705
Davis Is
McKEES
Jacks
Island
Ft Ft
Ft Ft
Ft Ft


Name
Steel Co. (Carrie Furnaces)
Steel & Wire Co. (Rankin Works)
Marshall Construction Co.
Bridge Co. (Rankin Plant)
Expanded Metal Co. (Ubsco Bros.)
Mfg. Co.
Machine & Mfg. Co
Rankin Co. (Braddock Works)
Wire Co.
Steel Foundry Co.
Steel & Wire Co. (Braddock
Steel Co. (Edgar Thompson Works)
Meter Co.
House Machine Co.
House Electric & Mfg. Co.
House Air Brake Co.
House Consolidated Foundries Co.
Sheet & Tin Plate Co. (United
Works)
Rolling Steel Co.
Tube Co. (Boston Iron & Steel Co.)
Tube Co. (Monongahela Furnaces)
Port Machine Co
Tube Co. (National Rolling Mills)
Tube Co. (Tube & Pipe Mills)
Sheet & Tin Plate Co. (Wood
Port Tin Plate Co
Tube Co. (Galvanizing Dept.)
Coke & Gas Co.
Co., N. Mfg. Co. (Spikes & Rivets)
Tube Co. (Seamless Dept.)
Steel Co. (Clairport Works)
Steel Foundry
Enfield Glass Co. (Glassport Factory)
Axe & Tool Co.
Spring & Axle Co.
Iron Co.
Brick Works
Foundry & Machine Co.
Wire Fence Co.
Steel Co. (Monessen Steel Hoop
Steel Co. (Monessen Works)
Sheet & Tin Plate Co. (National
Steel Co
Tube Co. of America
Evans Glass Co.
Lindsey Sheet Co.
W. B. Co. (Glass Bottles)
Steel Co. (Homer Plant)
Steel & Wire Co. (Homer Plant)
Steel Co. (Howard Plant)
Malleable Casting Co.
Diamond Engine Co.
Penola Mfg. Co. (Founders & Machin
Window Glass Co.
Machine Co.
Plate Glass Co.
Steel Co. (Hilton Works)
Penn Tube Co.
Bailey Sheet Co.
Co.
Steel Co. (Duquesne Works)
Steel Co. (Homestead Works)
Tube Co. (Shoe)
Steel Co. (Howard Axe Works)
Machine Co.
Bridge Co. (Walker Plant)
Walker, Refractories Co.
Car Wheel Co. (Keystone Dept.)
Penn Iron & Steel Co.
Vaughlin Steel Co. (American Iron
Works)
Nuts & Sons (Bolts, Nuts & Washers)
Tube Co. (Republic Dept.)
Steel Co. (Galvanizing Dept.)
& Bolt Co.
Foundry & Machine Co.
Co. (Bidler Works)
Glass Co. (Factory B)
(Anchor Rolling Mill)
Mill & Tank Works
Glass Co. (Factory B)
Sheet & Tin Plate Co. (Monon-
Works)
& Steel Co.
& Steel Co
Foundry Co.
Glass Co. (Factory E)
Glass Co. (Shipping Dept.)
& Son (Soap Works)
& Co. (Wrought Iron Pipe)
Porter & Co. (B. R. Spikes)
No. Name
252 American Steel & Wire Co. (South Side Works)
253 Pittsburg Terminal & Transfer Co.
254 Clinton Iron & Steel Co. (Clinton Furnace)
255 Union Foundry & Machine Co.
256 Lawrence, W. W., Paint Works
257 Carnegie Steel Co. (Palmer Mills)
258 Crucible Steel Co. of America (Works D)
259 Fort Pitt Malleable & Gray Iron Co.
260 McKay, James & Co. (Chain Works)
261 Kidd Bros & Burgher Steel Wire Co.
262 Fort Pitt Spring & Mfg Co.
263 Crucible Steel Co. of America (Works F)
264 Lockhart Iron & Steel Co.
265 Pennsylvania Malleable Co.
266 Schoen Steel Wheel Co.
267 Central Car Wheel Co.
268 Pressed Steel Car Co.
269 American Steel & Wire Co. (Neville Island Furnace)
270 West Pittsburg Oil Refining Co.
271 Island Petroleum Co.
272 Graham Nut Co.
273 Lewis Foundry & Machine Co.
274 Consolidated Lamp & Glass Co.
275 Canfield Oil Co.
276 Lake Carriers Oil Co.
277 Pittsburg Oil Refining Co.
278 Duquesne Steel Foundry Co.
279 Pittsburg Sheet Mfg. Co.
280 Refined Iron & Steel Co.
281 United States Wire & Nail Co.
282 Jones & Laughlin Steel Co. (Aliquippa Works) (Under construction)
283 Vulcan Crucible Steel Co.
284 Russel, J. C., Shovel Co.
285 Crucible Steel Co. of America (Aliquippa Works)
286 Colonial Steel Co.
287 Pittsburg Tool Steel Wire Co.
288 United States Sanitary Mfg. Co.
289 Townsend, A. C. & E. F. (Wire Rivets, Nails, etc.)
290 Beaver Valley Boiler Works
291 Pennsylvania Bridge Co.
292 Unity Drawn Steel Co.
293 Standard Gauge Steel Co.
294 Myers, M. H. & Co. (Shovel Works)
295 American Axe & Tool Co. (Beaver Falls Plant)
296 Knott, Harker & Co.
297 Beaver Falls Mfg. & Foundry Co.
298 Howard Stove Co.
299 Keystone Driller Co.
300 Emerson, Smith & Co. (Saw Manufacturers)
MONTROSE
HOBOKEN
Sandy Cr
Squaw Run
Monongahela River
ASPINWALL
Girtys Run
Allegheny River
SHARPSBURG
Lock No 2
Brilliant Cut Off
Negley's Run
ETNA
Pine C
WILKINSBURG
PENNSYLVANIA
MILLVALE
Nine Mile Run
Pitts Junction R
Baltimore & Ohio R R
Pittsburg & Lake Erie R R
Ohio River
ALLEGHENY
Lock No 1
Pool Elev 703
Pool El 701.4
Coal Tipple
Jacks Run
Spring Run
Bruno's Id.
BELLEVUE
AVALON
BENAVON
EMSWORTH
McKEES ROCKS
Saw Mill Run
Pittsburg & Castle Shannon R R
West Side Belt Line R R (Wabash R R)
Wabash
Pitts Chartiers & Youghiogheny R R
CLIFTON
DIXMONT
Pool El 655.6
Neville Island
Back Channel
Lock No 2
Moon Run
Montour Run
MOON RUN R R
AOPOLIS
TRAFFORD CITY
Pennsylvania Creek
Turtle Creek
WILMERDING
Pittsburg & Lake Erie R R
EAST PITTSBURG
BRADDOCK
Lock No 2
Pool 47 719.25
RANKIN
DUQUESNE
MUNHALL
HOMESTEAD
Thompson's Run
McKEESPORT
Baltimore & Ohio R R
Pittsburg McKeesport & Youghiogheny R R
WEST HOMESTEAD
HAYS
VIRGINIA
Baltimore & Ohio R R
Streets Run
DRAVOSBURG
OTTO
GLASSPORT
Coal Tipple
MONONGAHELA
WILSON
North
Pennsylvania Rail Road (Lines East)
Lines (Lines West)
Baltimore & Ohio R R
Pittsburg & Lake Erie R R (N Y Central Lines)
Wabash R. R.
Union R. R.
Pittsburg, Bessemer & Lake Erie R R
Monongahela Connecting R R
Miscellaneous R R's



INDUSTRIAL MAP
OF
MANUFACTURING WORKS
PITTSBURG DISTRICT
SHOWING THEIR PROXIMITY TO RIVERS.

Compiled by
THE LAKE ERIE AND OHIO RIVER SHIP CANAL CO.

MAY 1907

Scale in Miles

PITTSBURG DISTRICT
(Monongahela, Allegheny and Ohio Rivers)

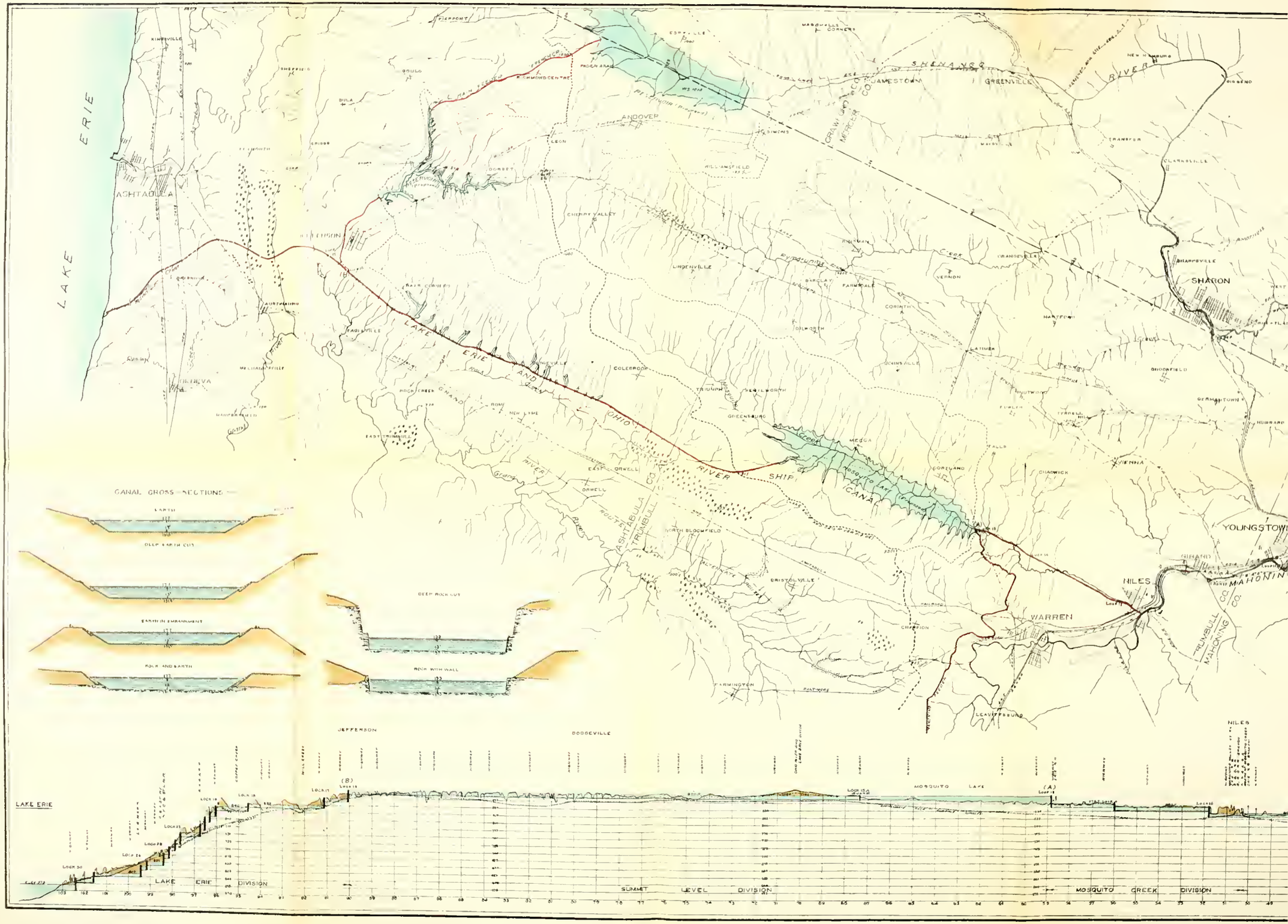
	Number in Map District
• Iron and Steel Works	260
⁕ " " " with furnaces	14
○ Miscellaneous	50
Furnaces	46
" building and proposed	7
" in whole district	48

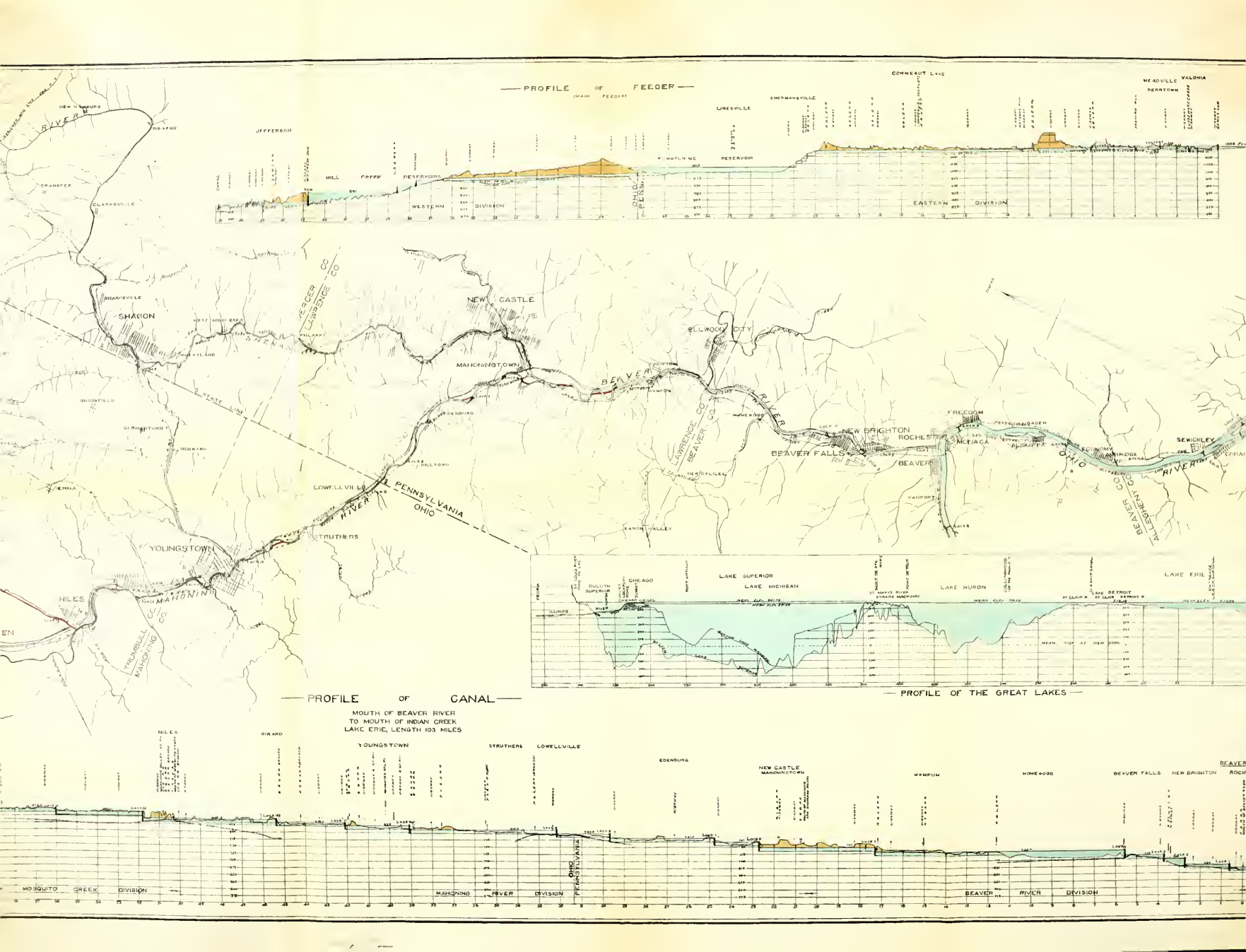
VALLEY DISTRICT
(Shenango and Mahoning Rivers)

Furnaces	38

WHEELING DISTRICT
(Ohio River, 65 miles below mouth of Beaver R.)

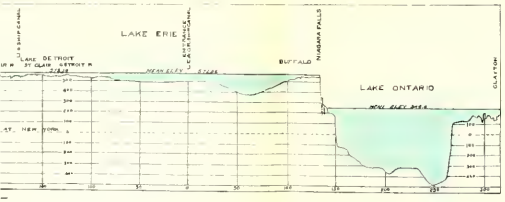
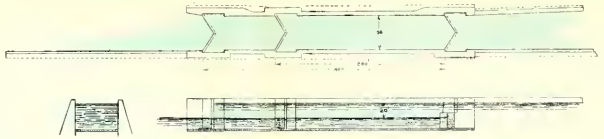
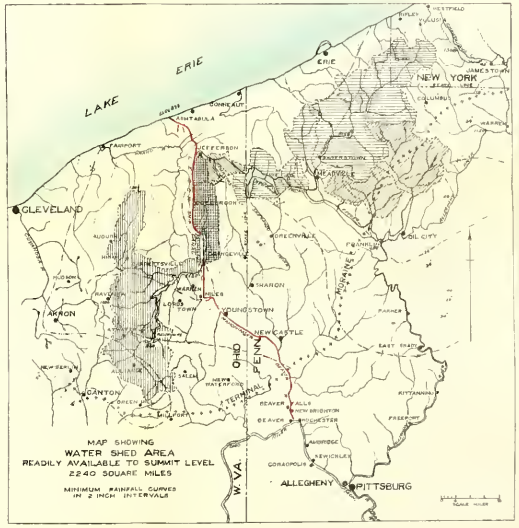
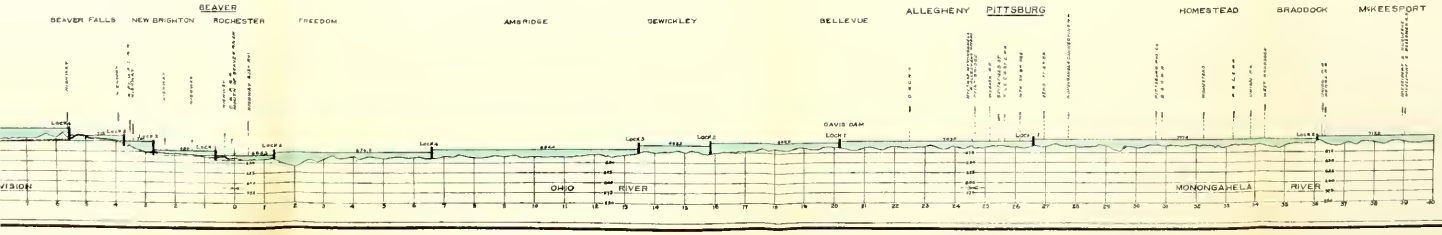
Furnaces	14
Total number of furnaces, built	100
" " " in blast	94


LAKE ERIE
ASHTABULA
JEFFERSON
ANDOVER
LINDENVILLE
SHARON
GREENVILLE
SHENANGO RIVER
CRAWFORD CO
MERCER CO
LAKE ERIE AND OHIO RIVER SHIP CANAL
GRAND RIVER
Grand River
Mosquito Creek
MOSQUITO LAKE
ASHTABULA TRUMBULL CO'S
TRUMBULL MAHONING CO'S
NILES
WARREN
YOUNGSTOWN
MAHONING
CANAL GROSS SECTIONS
EARTH
DEEP EARTH CUT
EARTH IN EMBANKMENT
ROCK AND EARTH
DEEP ROCK CUT
ROCK WITH WALL
LAKE ERIE
JEFFERSON
DOUGEVILLE
NILES
(B)
(A)
LAKE ERIE DIVISION
SUMMIT LEVEL DIVISION
MOSQUITO CREEK DIVISION


PROFILE OF FEEDER
(MAIN FEEDER)
CONNEAUT LAKE
MEADVILLE
VALONIA
CONNEAUT
JEFFERSON
GIRARD
NEW WILMINGTON
TRANSFER
CLARKSVILLE
SHARPSVILLE
SHARON
WEST MIDDLESEX
STATE LINE
BROOKFIELD
GRANGERTOWN
IRISHTOWN
VIENNA
NEW CASTLE
MAHONINGTOWN
BEAVER
ELLWOOD CITY
LOWELLVILLE
PENNSYLVANIA
OHIO
STRUTHERS
YOUNGSTOWN
NILES
MAHONING CO.
TRUMBULL CO.
MILL CREEK RESERVOIRS
WESTERN DIVISION
EASTERN DIVISION
PYMATUNING RESERVOIR
SHERMANSVILLE
GREENVILLE
TRANSFER
PENNSYLVANIA
OHIO
LAWRENCE CO.
BEAVER CO.
BEAVER RIVER
HOMEWOOD
NEW BRIGHTON
BEAVER FALLS
ROCHESTER
MONACA
FREEDOM
ALIQUIPPA
VANPORT
SEWICKLEY
ALLEGHENY RIVER
OHIO RIVER
PROFILE OF THE GREAT LAKES
LAKE SUPERIOR
LAKE MICHIGAN
LAKE HURON
LAKE ERIE
DULUTH SUPERIOR
CHICAGO
ILLINOIS RIVER
PORT ARTHUR
PORT HURON
DETROIT
ST MARYS RIVER
STRAITS MACKINAC
ST CLAIR
LAKE ST CLAIR
DETROIT R.
MEAN TIDE AT NEW YORK
PROFILE OF CANAL
MOUTH OF BEAVER RIVER
TO MOUTH OF INDIAN CREEK
LAKE ERIE, LENGTH 103 MILES
NILES
GIRARD
YOUNGSTOWN
STRUTHERS
LOWELLVILLE
EDENBURG
NEW CASTLE
MAHONINGTOWN
WAMPUM
HOMEWOOD
BEAVER FALLS
NEW BRIGHTON
MOSQUITO CREEK DIVISION
MAHONING RIVER DIVISION
BEAVER RIVER DIVISION
PENNSYLVANIA
OHIO

MAP AND PROFILES
OF PROPOSED
LAKE ERIE AND OHIO RIVER SHIP CANAL
PITTSBURG, PA.
1907

SCALE MILES

EMIL SWENSSON
T. P. ROBERTS
CONSULTING ENGINEERS

GEORGE M. LEHMAN
CHIEF ENGINEER